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American Railroad Journal.

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Saturday, December 15, 1849.

Iron Ores and the Iron Manufacture of the United States.

Continued from page 768.

MARYLAND.

Hematites.—As I have before mentioned, the next rock formation to the ferruginous sands and clays of the coast is that of the granite gneiss and serpentine, which occupies a belt parallel with the general outline of the coast, and in Baltimore county from six to eight miles in width. This belt of primary rocks, which farther north is productive in magnetic iron ores, is in this State nearly barren of them. Next beyond this is the range of metamorphic slates and limestones, which throughout their course from Canada to Alabama abound with hematite ores. Their first appearance towards the northeast is in Cecil county, near the corner of the State. Here they are worked to some extent for the *Principio furnace*. On the other side of the Susquehanna, in Harford county, they are found in the valley of Deer Creek, and supply the *Lagrange furnace* and the *Sarah furnace*.

Farther towards the southwest they have been wrought for the old *Hampton furnace*, now long out of blast, at several localities from eight to nine miles north of Baltimore. The principal bed is a mile northeast from Towsontown, and from three to four miles east from the Baltimore and Susquehanna railroad. The ore with its ochres and clays lies along the southern side of limestone ledges, which are seen dipping steeply towards the north. The old excavations were along the face of these ledges for some 40 rods in length, and more than as many feet in depth. Throughout these, over a very irregular width, the ore appears to have been found in considerable abundance principally close to the limestone strata, and where these were interrupted, working through and behind them, filling all the irregular spaces between the ledges. Around this long excavation are huge piles of the rubbish ochres and clays, and pools of water and mud cover its bottom. A little stream flows out from it at as low a level as it could well be carried. The difficulties attending deeper drainage seem to be the principal cause of the abandonment of mining operations here. To carry them farther steam power would be required to keep the workings dry. In some recent excavations for limestone nests of ore in the ochres are exposed to view, which enable one to judge of its quality, if the loose pieces and large heaps of good "wash ore" lying around were not sufficient. From these it is seen that it was the very best kind of hematite, of open honeycombed structure, of shelly layers, colored on the outside with yellow ochre, and within of chocolate and dark brown shades, with no intermixture of foreign matters. It is of a character that must work very freely in the furnace, and make the very best qualities either of forge pig or foundry iron; and such was the character of the metal made in the Hampton furnace. A portion of it was refined at the old forge near the mouth of the Great Gunpowder Falls, and the bar iron bore the highest character for softness and toughness. At that day the furnace, forge and mines, and laborers too, belonged to the Ridgeley estate, which comprised a territory of full a hundred thousand acres. The mines are still in possession of the heirs of this property.

From the 10th to the 18th mile posts along the line of the Baltimore and Susquehanna railroad, localities of hematite are of frequent occurrence near the road and for miles back towards the east and west. It is seen on the east bank of Gt. Gunpowder Falls two miles north of the old Hampton furnace, and is met with in numerous localities between this furnace and Timonium. Here it has been opened at several places on each side of the road, but the ore has proved too siliceous for it to be an object of much importance: it is mixed with quartz, and is not yet found directly on the road where it could be obtained in great abundance at small cost for mining. Still farther west up the valley of Jones' Falls, towards Green Spring, these localities continue of frequent occurrence, extending southward nearly to the serpentine rocks of the "Bare Hills." A northern range of the same ores is found crossing the railroad at Cockeysville, pursuing a westerly course up the valley of Beaver Dam Run. Between these on the railroad are the great limestone and marble quarries of Texas and Timonium; and back from the road on the east and west are extensive unproductive hills of talcose slate and quartz. The formations closely resemble those of Berkshire county, Mass. Here are found the "Stockbridge marble," the hematite ores, and the barren ridges of talcose and mica slates and quartz rock.

The most important of these localities yet proved is on one of the head branches of Beaver Dam Run, three miles from the railroad at Cockeysville. The deposit lies along the north side of a ridge which here ranges in an east and west direction. The ore shows itself for more than half a mile, and has been opened and extensively worked the last two years at several points. The main body of the ore is found under about fifteen feet of clays and ochres; from this depth it becomes more and more solid and less mixed with these matters so far as the workings extend, which was, when I saw the locality last winter, about forty feet from the surface. Here the hematite lies in masses, sometimes of several tons weight, closely packed together in the ochres and clays. Some of them are partially hollow, the cavities coated with mamillary, stalactical and botryoidal surfaces, and the structure generally shelly and fibrous. The large hollow lumps are formed within of the pure fibrous ore, the grain running transversely through from the inside outwards; but before reaching the outer surface this fine ore invariably gives place to a shell of poor siliceous hematite, of far inferior quality. The quality of the ore varies in different portions of the mine with the relative proportion of these two va-

rieties. The quantity is evidently very great; many thousand tons have been removed; but no indications are yet obtained what are the dimensions of the bed. Situated in the hill it is so far worked without trouble from water; and from the abundance of the ore, the expense of extracting it cannot exceed sixty cents per ton. It is owned by Messrs. Green & Fernandez, the proprietors of the *Oregon furnace*, built in 1848 on the bed, and by Messrs. Patterson, Small & Co., the proprietors of the *Ashland furnaces*, three miles from it on the railroad.

Other deposits of hematite are said to occur farther west on this range near Reisterstown: these I have not seen.

The general character of most of these ores is their large percentage of siliceous matters, which in the form of grains of white quartz occurs scattered through the ore. They resemble the poorer ores of North Adams, Mass., and of Kent, Conn. Alone they must work badly in the furnace, separating with difficulty and producing a thick pasty cinder. Mixed with ores that contain no silex and with a pure calcareous flux, they can be used to some extent; and none would seem to be better adapted for this mixture than the carbonates of the coast—and it is matter of surprise that so little attention has been given as yet to them in this connection. Care will be required in selecting the best qualities and in mixing them in proper proportions with other ores and suitable fluxes. Should it be found that good iron could be made even with a small portion of them to the charge, their value must be very great from the number and extent of the mines, the convenient situation of many of them on elevated ground, and the cheap rates at which the ores can be transported. Some of the beds opened in 1848 below Timonium furnish ores of so siliceous character, that they would discourage all further operations, unless it were found that different portions of the same locality of ores gave different varieties —and the indications are that such is the case.

As to the permanence of these beds I have seen no evidence yet of any one of them having been worked out, though the surface indications of many of them certainly appear to limit them to a narrow extent. Those which have been worked for the Hampton furnace and then abandoned were evidently left in consequence not of failure of ore, but of the increased expense of procuring it from the influx of water. In this State, therefore, as in New York and New England, no data have yet been obtained touching the depth to which these deposits extend. It is interesting to observe their connection with the limestone strata still prevailing, though not proved to be so universal in this region perhaps as at the north; it is, however, a remarkable feature at the greater number of the localities.

On the line of the Baltimore and Ohio railroad some deposits of hematite are found in the vicinity of Sykesville, 32 miles from Baltimore, which no doubt are on the continuation of the same range toward the southwest. They have been as yet but little explored, small quantities having been obtained for the furnace at Sykesville.

Over the greater part of Frederick county the same formations prevail, and are productive in these ores in the vicinity of the Catoctin mountain. The Catoctin furnace, 12 miles from Frederick, is supplied with them.

The beds near the Point of Rocks, which, though on the Virginia side of the Potomac, are of no small consequence to the State of Maryland, are on this Catoctin range. They furnish ores to the *Potomac furnace* in Loudon county, Va., near the bed, and also to the furnace at Sykesville, and probably will to the two furnaces at Georgetown, D. C.

Beyond the South mountain the *Antietam furnaces*, in Washington county, make use of the same variety of ore, which is found of superior quality in their vicinity. Prof. Ducatel, in his Report for the year 1840, seems to consider these ores as nearly exhausted. One locality which supplies these works he says is two miles above Harper's Ferry, on the Maryland side of the Potomac, and another similar deposit is on the Virginia shore six miles above the Ferry. "The ore is of that variety usually termed *pipe-ore*, or sometimes *limestone ore*, from the circumstance of its usually occurring in this rock. It yields a metal of very good quality, well adapted to the manufacture of bar iron, and is said to be in great esteem at the U. S. armory, Harper's Ferry, from which the works are only at a short distance." Still farther west among the secondary strata, not far below the coal formation, hematite ores are found near Hancock, which have been smelted in the *Warren furnace* over, the line in Pennsylvania. The group of rocks containing these hematites is the olive slate formation, which underlies the old red sandstone. It contains in different portions of its range in Pennsylvania and Virginia occasional deposits of this ore of no great value either for its quality or quantity.

Specular and Magnetic Ores.—In the gneiss rocks, which are associated with the talcose and mica slates in Carroll county, from the Pennsylvania line to the west branch of the Patapsco, specular iron ore is of frequent occurrence. It is spoken of by Prof. Ducatel in his Annual State Geological Report as being found in large masses north of Westminster, and again north of Manchester. There are also beds of it of some extent on the Little Morgan Creek, north of Freedom, and others of great promise only one mile north of the Baltimore and Ohio railroad at Sykesville. The ore is here found on the property of George Patterson, Esq., in some hills of gneiss rock. The rock as seen exposed in this place in several mounds of considerable elevation is strongly impregnated with this ore, and some slight excavations have exposed veins of it near the surface. Of their dimensions I cannot speak with exactness, the holes being partially filled with dirt and rubbish, when I saw them in the winter of 1848-9, but from the large blocks of pure ore taken out from them, and from others scattered about over the surface, there is every reason to believe in the existence here of many veins of this ore of no small extent. From their position on elevated ground and the richness of the ore, and its proximity to the railroad, it must become an object of great value; and its importance is not a little increased by its convenience to the carbonates of Baltimore and the hematites of the Point of Rocks, all of which can be brought together to mix to their mutual advantage at little cost of transportation. In external appearance this ore much resembles that of the Iron Mountain, Missouri, and like this is no doubt well adapted for the manufacture of the best bar iron and steel; it gives a red powder, and appears to be only the peroxide of iron, but its particles are found to be magnetic, showing also a combination of the protoxide. Its structure is massive and finely granular; but much that has been taken for the furnace at Sykesville is nothing more than rock with interspersed grains of ore, some of it having the appearance of the micaceous specular oxide of iron. When the veins shall be explored, there will be no reason for using this lean ore. At present the right of taking the ore from the different localities on this large property of Mr. Patterson is held by the proprietors of the furnace at Sykesville, who by the original contract were to pay one dollar for each ton mined and removed.

Ores of the Secondary Formation.—The iron ores of this formation in Maryland are principally those found in the shales accompanying the beds of bituminous coal. But at Cumberland in the red and variegated slates, which belong far below the coal group, similar ores are found to those which the same formation, called in New York the Clinton group, produces near Oneida Lake, New York, and Catawissa and Danville, Pa. One variety of them and the most abundant is a lean, sandy ore, occurring in continuous bands, similar to that at Danville, and another is the red fossiliferous ore like the Catawissa. Of the extent of the bed I am not provided with any details. Large quantities of the poor ore have been mined and sent to the Mt. Savage works; and a small stack called the *Lena furnace* at Cumberland has been supplied in part with these ores and in part with hematites from the Virginia side of the Potomac. These ores smelted with coke have yielded an iron better adapted for foundry than forge purposes, not unlike some of the Scotch pig. The remoteness of the locality from tide water, it being about 190 miles from Georgetown, D. C., by canal, will materially interfere with any interest that might be felt in an ore suitable only for foundry purposes, for supplying the market on the coast. If, however, on farther trial the fossiliferous ores and hematites together should be found to yield pig iron suitable for puddling, as they do in some parts of Pennsylvania, then the importance of the locality is much enhanced.

Ten miles beyond Cumberland to the west commences the great western coal field of Maryland, a country traversed in a north-north-east and south-south-west direction by long parallel mountain ridges. Between these ridges, which are not more than four or five miles apart, the country is extremely rough, cut by the streams which traverse them, into deep furrows, which go on increasing in depth and width as the streams descend to lower levels. The coal formation, the uppermost group of strata, lies between the ridges as in a basin. Beds of sandstone, shales, limestones, coal and fire clay, piled in succession one upon another, extend with great regularity from one extremity of these valleys to the other; they slope down the sides of the ridges on the east and the west, and in the centre attain a thickness estimated in one portion at no less than 1500 feet.* The deep cuts of the streams expose similar sections of strata upon each side. The same coal beds are traced without other break or dislocation, than those produced by surface denudation, through hills and across ravines over large portions of the coal field. Even in the different basins the order of succession is not so changed, but that many strata are recognised as belonging to them all. Beneath this group, called the coal formation, is usually found in Pennsylvania and Virginia a coarse white conglomerate rock, which occupying a similar position even in England, is there called the "millstone grit." Here if it is not wanting, the coal beds are repeated below it, and the base of the formation is the series of grey sandstones, which overlie the old red sandstone. These sandstones then come up to the sum

* Annual Report of the Geologist of Maryland, 1840, p. 19.

mits of the ridges and curve far beneath the valleys, where rest the coal measures.

In the western part of Maryland there are at least three of these basins crossing this narrow strip of the State from north to south. The most western is along the Virginia line, and is the valley of the Youghagany river. Another is between Negro mountain and Meadow mountain, and the most eastern, which is also the most important, is between the great Savage mountain on the west and Dan's mountain on the east. This basin being more convenient to tide water than either of the others, has received no little attention from foreign and eastern capitalists, both for the sake of its coal and iron ores. It is only in this portion of the coal field of Maryland, that works have been established for the reduction of these ores; it is the only portion, therefore, that will require particular notice in these papers. Its extent across the State is about twenty miles, its width between the ridges from four to five. George's creek, rising in its most elevated portion, only a few miles from the Pennsylvania line, flows southwardly through its centre, and empties into the north branch of the Potomac at Westernport. It is fed by numerous lateral mountain streams or runs, whose deep cuts give access to the strata they expose. On the north side of the elevated part of the valley Braddock's Run and Jenning's Run flow in the other direction, and then turning to the east empty into Will's creek, which joins the Potomac at Cumberland.—It is at the heads of these streams about Frostburg, near the national road, that the coal formation attains its greatest thickness of 1500 feet above mentioned. Here are the mines of many of the companies, which have undertaken to supply the eastern markets with coal, and have already commenced or propose to smelt the iron ores. The only furnaces yet built are the three of the Mount Savage company near Frostburg. A few miles farther south in the basin, on a small branch of George's creek, is another at a place called Lonaconing, belonging to the George's Creek Coal and Iron Company. The ores which supply these furnaces are the argillaceous ores or clay iron stones of the coal formation. They are found in the beds of shale, lying either in continuous bands or in balls and kidney-shaped masses arranged in parallel layers in the shale, much like the carbonates in the clays around Baltimore. But unlike these they are worked, not open to the day, but by drifts and underground excavations, whose height from the roof to the floor seldom exceeds eight feet. The expense of the mining per ton consequently varies with the quantity of balls of ore found in this or a less thickness of shale. Where the layers are thick and near together they are profitably followed like beds of coal far in from the surface; but where a arge proportion of shale must be removed for a few thin layers of ore, the expense of extraction often exceeds their value. It is very questionable whether under present prices of labor and transportation these ores exist throughout the basin in such abundance, as to render them an object of great importance; though at some few localities they may be profitably worked. In composition they are among the poorer varieties of iron ores, their yield in iron not exceeding 30 per cent.; and moreover the metal made from them is of inferior quality for forge iron, being like the Scotch pig, which is made from similar ores, better adapted for foundry purposes. They have the advantage of being in close proximity to extensive beds of excellent bituminous coal, which furnish either in the raw state or as coke a cheaper fuel than wood, and one well adapted for their reduction. The limestones, sandstones and fire clay also, of the coal formation, furnish other materials required for their conversion into iron, evidently arranged in close proximity to each other with reference to this use. The country around, though broken and rough, has many fertile spots in its valleys and on its hill sides, where abundant supplies of grain and vegetables can be raised for the support of a mining and manufacturing population; and the rapid falls of its streams furnish abundant water power conveniently situated for manufacturing purposes. H.

From the London Artizan.

ROYAL CORNWALL POLYTECHNIC SOCIETY.

An Essay on the Comparative Merits of Iron and Wood for Ship-building. By Edwin O. Tregelles, C. E.

Continued from page 771.

"*Stowage.*—The shell of a timber built vessel is so much thicker than that of an iron one, that with the same outside dimensions, the latter is frequently 18 inches wider and 12 inches deeper in the hold than the former; taking the most favorable part of a vessel, namely, in the centre of the length in a vessel of 200 tons, the proportion in favor of the iron vessel will be as 5 to 6, but in the ends which are drawn finely off the disparity is much increased, making the proportion of the whole contents about as five to four. Supposing, therefore, that a vessel built of timber could stow 200 tons she would if made of iron have room for 250 tons.

"*Safety.*—In addition however to their extraordinary strength, iron vessels afford protection both to life and property, against the most awful accident that can befal a ship at sea; namely, against fire. I admit that it can signify little to unfortunate passengers, of what material the hull of a ship is made if her cargo, deck, cabins, and masts are consumed; and no one who might escape the conflagration, could then remain in her. But with ordinary precautions, it would be nearly impossible for a fire to take place or to gain head in the hold of an iron ship, provided the hatches were properly secured.

"*Speed.*—The material being much lighter to attain the same strength and occupying less space, the model of the vessel may be made finer and better adapted for high speed, without a corresponding loss in the amount of stowage and carrying qualities; and iron vessels, as they have more buoyancy, are not so liable as timber-built vessels to pitch when in a heavy sea. These assertions are not the result of mere theoretical speculations, but are derived from a long course of observations, guided by the opinions of many practical men who have become converts to the adoption of iron, as a preferable material to wood, in the construction of vessels.

"*Durability.*—It is, as yet, impossible to assign any period for the duration of iron vessels in salt water, inasmuch as they have not been tried for a sufficient time to enable us to ascertain this point with precision; the want of this proof must, however, be considered favorable, from the fact that were their decay as rapid as that of wooden vessels such a result would already have become manifest. The instance of the *Aaron Manby* will be in the recollection of many; she was launched in 1822, has been alternately employed in fresh and salt water, and is stated to be in good condition. The *Garryowen* has been about eight years in salt water, and is not yet perceptibly injured by decay;—but the iron vessels of the Clyde probably furnish us with more decided proofs than any others of the durability of the material in salt water. It is well known that some of the first built of those vessels were extremely slight, yet it is truly surprising, when the frequent rubbing on the banks to which they are exposed is considered, how little effect time seems to produce upon them; so slight indeed is the apparent decay when the vessel is in use and so much slower is its progress than is exhibited by iron when applied to other purposes in salt water, that many who have observed the fact, are led to suppose that some occult and preservative law is in operation, peculiar to iron so employed. A similar effect is said to be observable on the iron rails of a railway; the corrosion of which appears to be much less rapid when they are acted upon by carriages passing along them, than when they are lying in detached bars on the road side. We now turn to the consideration of the durability of timber built ships—and where, I would ask, in the catalogue of objections, real or fancied, to iron ships, is there one to be found equal to that dreadful scourge to wooden vessels, the dry rot?—the effects of which are too well understood by ship-owners to require any lengthened remarks from me. I should not, however, do justice to my subject did I pass it over in silence. No age has been without its nostrums, its quackeries, and its infalliable remedies for the dry rot; and no period has been so productive of them as that in which we live; but from all I can perceive, this plague is as prevalent as ever. How many stately vessels are now mouldering away under this destructive visitation, while their fine and graceful forms conceal the treacherous enemy within!

"*Repairs.*—The usual calculation for a timber built steamer is, that the expense of repairs will, in ten or twelve years, have equalled the first cost. In a well built iron steamer, repairs will not, I believe, have become necessary within that period, provided the vessel has not been injured by accidents; and under any circumstances, I feel confident it will be more expensive to keep in repair the copper sheathing alone of a wooden vessel than to effect the whole repairs in the hull of an iron vessel.

"*Cost.*—No one, it may also be remarked, can avoid observing and lamenting the low state in this country of what may be termed mercantile naval architecture, in which men of science meet with little or no encouragement to attempt improvements, and have become weary of a system which, for many years, has brought them no return. But let us hope for better things in iron ship building; let us trust that both owners and builders will see that their interest lies, the former in procuring good sound vessels, and the latter a price that will leave no excuse for imperfect work.

"From a careful consideration of the question of cost, I have arrived at the following conclusions:

"1st. That a good serviceable iron sailing vessel, not exceeding 300 tons burthen, will be equal in cost to an English-built twelve years' timber ship of the same external dimensions, without including the price of copper sheathing for the latter.

"2d. That iron vessels of about 300 tons, have the advantage of being rather less expensive than wooden vessels.

"3d. That for very large merchant vessels, iron will also be found to be much less expensive than wood.

"4th. That iron sea-going steamers bear also about the same proportion, according to their different sizes.

"5th. That iron vessels for rivers may be built at a light expense, but so built are unfit for sea service.

"This estimate is to be considered to apply only generally, as the cost of either wood or iron vessels is raised by the cost of the materials and the style of finishing.

"*Draught of Water.*—Iron sailing vessels may be built of any requisite depth and sharpness for holding on in a sea way; but where a light draft is essential for a peculiar service, it may be attained to a greater extent by the use of that metal than by timber. This advantage, of course, arises from the weight of iron necessary in the construction of a vessel, being much less than the weight of wood required for the same purpose."

In the foregoing remarks by John Grantham, allusion is made to bulkheads, which are an important provision in case of leakage from striking on rocks or other causes. The bulk-heads are watertight partitions, going completely across the hold of the ship, dividing it into four or five or more independent parts, so that if a leak occurs in one, the water only rises to a certain level in that division of the vessel without affecting the rest, and a vessel thus arranged may voyage a thousand miles in safety with a large leak, and without requiring pumping. We must not conceal from ourselves that a strong predjudice or alarm exists on account of the aberrations of the compass; but this difficul-

ty is considered to be completely overcome by proper measures for correcting the errors. We are indebted to Professor Airy for this onward and important step in the march of improvement. We have quoted largely from the work on iron ship building; we might give much more with profit, but prefer recommending the work to the perusal of those who are impressed with the importance of the subject as a national question, on which John Grantham, at page sixty-eight, writes as follows:—"There could not be a better period than the present, when the foundations of every commercial system seemed to be shaken, and men are looking around in dismay at the depression that weighs down every branch of trade; there could not be a better period for considering with deep attention a question such as this, and endeavoring to draw from it some assisstance towards alleviating the general distress. As a national subject, it will be found to possess more claims to our attention than are at first apparent."

These observations were written in 1842, and appear equally applicable in 1849. If this question be rightly considered, and fairly tried during the ensuing seven years, it will not be needful to write elaborate treatises to prove that for ship-building "there is nothing like iron!"

The application of iron to form a nest, or series of boats, may be very valuable for passenger ships. Six such boats might lie on the deck of a steamer, one under another, accupying only the space of one, by having the thwarts made to unship and be ready at hand to be brought into action in a minute during an emergency. Six boats, each weighing about half a ton, would carry 180 to 200 persons, and a system of this kind is exceedingly important for all passenger ships, whether steamers or others.

It cannot be denied that the accident which befel that magnificent ship the *Great Britain*, in Dundrum Bay, did much check the progress of this improvement; but whilst it is admitted that this disaster checked the earnestness of our merchants to avail themselves of iron vessels, it may be pointed out as a triumph in the achievements of science, that costly as was that ship in iron, it would have been vastly more so if it had been built of wood, and it is probable that if it had run ashore as did the iron ship it would have gone to pieces in less than a week, instead of braving fearful storms for several months, and eventually floating off the beach, yielding to the judicious appliances of the talented engineer who had the charge of her construction. The few cases of failure in iron vessels are widely published, whilst some of the very remarkable instances of escape are scarcely recorded; in addition to the instances already quoted, may be mentioned the accident which befel the *Talbot*, a fine iron steamer that was built by the Neath Abbey Iron Company, to ply between Bristol and Port Talbot. One morning this vessel was leaving Bristol river with a cargo, and being caught aground, was left by the tide supported by the head and stern, lying completely across the river on her side, and was left so dry as for a boat to float under her; in this position she remained a whole tide until the water rose, when the engines resumed their duties, and conveyed her away uninjured to Port Talbot.

In considering the benefit obtained by using iron in preference to wood, we must not forget that the leakage of an iron vessel is scarcely appreciable; and if leaks occur, they are commonly very easily discovered and stopped, so that there is no bilge water—a consideration of great importance in carrying corn and other kinds of food.

It is true that there may yet exist strong prejudices to be overcome. So there were against steam vessels, as fraught with danger of many kinds—so there were also against the introduction of iron beams instead of wood for steam engines; there are engineers now living who remember this change, and the prejudices. How difficult it would be to avoid the snapping of the beam if the engine struck on the spring beams—how frightful would be the calamity of the cast iron beam of a pumping engine falling into the engine house, or of the other end tumbling down the shaft of the mine! Many such prognostications were made, and some realized; but does any engineer, any sound mechanic, contemplate the idea of reverting to the wooden beam with its cast iron caps, and wrought iron straps? An excellent engine beam, of enormous strength, might be made of wrought iron plates; but the attempt would be almost vain to form a frame work of wood, however elaborate or well designed, that should be equal to the strength of the cast iron beams now used for the engines in Cornwall. If iron were not applicable for engine beams, the engines of Cornwall must of necessity be much smaller in their dimensions and power—the deep mines could not be drained, nor their wealth developed; and so it may be said of iron for the use of vessels; without it we shall remain stationary, or retrogade, amongst nations in the march of commerce; but if we avail ourselver of the advantages placed within our reach, we may again become proverbial for intelligence and prosperity.

To be Continued.

THE MANUFACTURE OF IRON IN ALL ITS BRANCHES: By Frederick Overman, Philadelphia.

We are pleased to welcome this addition to the metallurgic literature of our country. It is an octavo book of 490 pages by one who has had much experience in the manufacture of iron in Germany and other countries of Europe, and for the last five years in the bituminous and anthracite regions of Pennsylvania. The character of the work is decidedly practical; but while it shows an intimate knowledge in the author of the minutest details of the business, it also proves him to possess a profoundly scientific knowledge of the principles in the manufacturing processes. We recommend the work with pleasure to all whose interests lie in this department of business, and shall take eccasion soon to furnish a more particular notice of it.

Deflection of Railway Bridges under the Passage of Heavy Bodies.

BY PROF. WILLIS, F.R.S.

In these, our notes of Prof. Willis' Birmingham lectures, we have endeavored to give as close a digest of his remarks and deductions as the nature of the subject, and the manner of its treatment would allow. It is to be premised that, some time ago, a commission was issued from government for the purpose of investigating the actual results of the application of cast iron to railways—as in bridges or beams. Professor Willis was a leading member of this commission; and the purpose of the address now under notice was to detail a portion of the results to which this inquiry had led, and the route by which the investigation had arrived at them.

It was found absolutely necessary to ascertain, practically, what were the effects of the passage of heavy loads over iron bridges—our information being confined to the knowledge of the effect caused by an engine and tender at rest on the bridge—when the train was in motion, no one knew whether the deflection was greater or less than before.

To determine this point, a temporary railway was erected in Portsmouth dock yard, having an inclined plane, arranged to give any required velocity to the experimental carriage. With this apparatus a long series of experiments were made, the weights of the loads being varied to extremes, and the final ascertained result was, that the statical deflection—or that arising from the weight of the carriages at rest at the centre of the supporting bars—was three or four times less than that caused by the same weight in motion. This result was well illustrated in a small model railway, on which a luggage waggon travelled. The great object being to eliminate all obstructing causes, it was found necessary to commence their experiments on a small scale, and to obtain some other material than cast iron—some material indeed, that from its delicacy of texture, would give closer results, and free from the objections of a practical "set." In the more recent experiments, therefore, cast steel bars were used; and to do away with any irregular pressure of the carriage—it having been found that more pressure was sometimes given to one bar than to the other—one bar only was used. The trial railway was about twenty-five feet long, formed of deal planking, and having at one end an inclined plane about twenty feet high, upon which was an adjustable catch, set to hold the carriage at any required height, and insure accuracy in the starting-point. The bridge occupied the centre of the beam, and the level end was so made as to open outwards that springs fixed on both sides of the carriage might clasp the sides of the line, and retard the motion, to prevent running off the line altogether.

With the model, the lecturer went through a great number of experiments, with various speeds of movement, always giving the result of a triple deflection of the bar during the movement, compared with that arising from the mere stationary weight. Comparing the model with a full-sized bridge, a great difference is apparent; for, whilst the weight of the bridge is always much more than any passing weight, the weight of the bar in the model was much less. To strengthen the bar, an ingenious plan was resorted to, wherein the weight to be deflected with it was increased, and this showed that the increase in the weight of the bridge diminished the deflection. To take this as a general principle, would, however, involve serious errors, for cases occur where an increase in the weight of the bridge actually increased, instead of diminishing, the deflection. It is, however, to be remarked, that the objectionable facts connected with the deflection of railway bridges, do not exist in practice to anything near the extent hinted at in the theory; and, practically speaking, the actual deflection is so slight. that it may be entirely disregarded. This fact the commission has established, by detailed experiments upon a bridge on a railway in Surrey.

Some experiments were also made at Portsmouth, as to the advantage to be gained by curving the bars upwards. By doing this, the centrifugal force was undoubtedly diminished, and the deflection was consequently lessened; but no practically useful fact has yet been elicited.—*Practical Mechanics' Journal.*

Pennsylvania.

The Progress of the Baltimore and Ohio Railroad is exciting much attention in the various sections of the country which propose forming connection with it; and we find in the western papers the proceedings of a convention held in Somerset county, Pa., on the 14th ult. The meeting was organised by appointing Hon. A. J. Ogle president, Isaac Hugus, John Hanna, and J. Row, Esqs., and Major John Knoble, vice presidents, and Col. John Weller, and Ross Forward, Esq., secretaries.

We copy the following resolutions, both as explantory of the object of the meeting, and as presenting some interesting facts relative to the route proposed for the road.

Resolved, That, in the opinion of this meeting. it is settled that Pittsburgh is the point at which the trade and the railroads of the Western States and of the Lakes are to be concentrated, and must therefore become the thoroughfare ultimately of the Great Central railroad connecting with the Atlantic and Pacific oceans.

Resolved, That it is the true policy of Baltimore, Washington city, Alexandria, Georgetown and Cumberland to connect themselves with the Great Central line of communication at Pittsburgh.

Resolved, That according to the reports of the Baltimore and Ohio railroad company, Pittsburgh is 118 miles nearer to Cumberland, the equated distance, by the Youghiogheny route, than Wheeling by the Virginia route, and the distance from Pittsburgh to Wheeling by the Ohio river being only 100 miles, consequently it is 18 miles nearer to go from Cumberland to Wheeling by way of Pittsburg than by the selected route through Virginia.

Resolved, That by the Youghiogheny river route from the point of divergence, following the river, without one foot of ascent, there is no grade exceeding 26 feet per mile, equivalent to a level, while the Baltimore and Ohio railroad, by the Virginia route, crosses at right angles tnree or four rivers, and as many intervening mountains, encountering long and steep ascents and descents, numerous and long tunnels and bridges, and was therefore properly pronounced by Mr. M'Lane, the late president of the company, to be a route of 'tunnels and bridges,' and to be in every proper sense of the word 'impracticable.'

Resolved, That the Youghiogeny route to Pittsburgh is not only by 50 per cent. the nearest, best, and cheapest route, but it terminates at the only

point where there is a certainty of meeting the western railroads, and drawing to Maryland and the District of Columbia any considerable portion of the trade of the lakes and the western States, 'the Ohio river,' as Mr. M'Lane observes, 'furnishing a precarious and limited feeder for a railroad, being for a considerable portion of the year either dry or frozen up.'

Resolved, That to maintain a successful competition for the northern and western trade, Baltimore and the district cities must connect themselves with the Atlantic and Pacific railroad, at the nearest, cheapest, quickest, and most practicable point, and the point furnishing the greatest amount of commerce and business; that the Youghiogheny route to Pittsburg can be made for less than one half the expense, in less than half the distance, and on which freight can be carried for less than one-half the expense that will be required on the Virginia route to its connection with the Great Central railroad aforsaid; that this statement is more than sustained by all the surveys and estimates made by the Baltimore and Ohio railroad company and others.

Resolved, That it is the most obvious dictate of common sense, that the only practicable plan of connecting the Atlantic and Western States by a railroad, is to follow an eastern river to its highest source on the one side, and the nearest western river from its highest source to its confluence with the Ohio—that the idea of crossing rivers and mountains at right angles is an absurdity and will be found, in the language of President M'Lane, 'impracticable,'—that even if made, travel and transportation will adopt the cheaper, quicker, snd safer roads following nature's routes, the rivers, leaving the visionary route of 'tunnels and bridgds,' ups and downs, over mountains and rivers, to perish by the slow but sure progrees of dilapidation and decay.

Resolved, That it is now ascertained that the steamboat navigation will soon be completed from Pittsburgh to Connellsville, leaving but 79 miles of railroad to connect the steamboats of the Ohio and Mississippi with the Chesapake and Ohio canal, and the Baltimore and Ohio railroad at Cumberland.

Resolved, therefore, That application be made to the Legislature of Maryland, at their next session, to incorporate a company to meet the Pittsburgh and Connellsville railroad company at the State line, which it is confidently believed cannot fail, when the great and decided superiority of this route over all others, and the great superiority over Pittsburgh as a point of connection, come to be fully and properly understood.

The friends of the Baltimore and Ohio railroad will not, we presume, be deterred from their present design of carrying their road direct to the Ohio at Wheeling, or a point still lower down. But, that as soon as this is accomplished, they will turn their attention to the extension of a branch to Pittsburgh we have not a doubt. Pittsburgh will soon be in communication with Cleveland by railway, and we cannot suppose that Baltimore will overlook so important a connection, and one at the same time so easily formed. The people on the route between Cumberland and Pittsburgh are losing nothing by this early agitation of the subject, for by the time that all preliminary proceedings are had, and the necessary amount of talk and conference gone through, they will find the Baltimore and Ohio road ready to give them a lift on this work.

The meeting was addressed by Col. A. M. Hill, of Fayette county, and Messrs. Pearson, Hughes, Forward, Witt, Wyand, Kimmell and Pearson, gentlemen well known in that section of the country, and the best spirit prevailed.

Beaver Meadow Railroad.

We learn that the managers of this road have concluded to remove their present flat bar rail, and place in its stead a heavy H iron rail weighing 60 pounds per yard; they have made a contract for a quantity of iron sufficient to accomplish that object with the Montour Iron Company, of Danville, and the Phœnix Iron Works, each company to furnish about eight hundred and fifty tons.

This improvement, which has been in contemplation for some time past, is now about being accomplished, and we view it as being of great importance to the interests of the middle coal field, and calculated to develope the mineral wealth of that region to an extent, which to those who are but partially acquainted with its location, can hardly be appreciated.

The Beaver Meadow railroad commences at the mines, near the pleasant village of that name in Carbon county, where it connects with the Summit railroad, from which there is now received about one hundred thousand tons of coal annually and the quantity will probably be increased from the Summit mines, and other openings adjoining to two hundred thousand tons in the course of the next two or three years. The railroad takes a southeasterly course to the town of Weatherly about 6 miles distant, where it is joined by the Hazleton railroad, from which it receives about one hundred and fifty thousand tons of coal annually, and the quantity will, from the number of new mines which are about being opened, probably increase fifty thousand tons annually for a number of years.

From Weatherly, its course is down the Quakake to Penn Haven on the Lehigh river, a distance of about five miles; just below Weatherly it is joined by the Cattawissa railroad which it is proposed to relay with iron rails, and when finished to the Girard lands, now owned by the city of Philadelphia, to which point the managers intend to carry a branch road, from this source may be expected in a few years at farthest a supply of coal, which for quality has no superior in the whole range of the anthracite coal fields in Pennsylvania.

From Penn Haven, the railroad follows the course of the Lehigh, to Shipping Port opposite to Mauch Chunk, a distance of about nine miles, its present termination—its entire length being twenty miles.

From the fact that the Beaver Meadow company on their present imperfect wooden road, transport at this time over three hundred thousand tons of coal annually, and that a much larger quantity would immediatety be brought upon it, if the delays incident to a wooden road were removed, it is apparent that with the greatly increased facility, which will be furnished by a first class iron road, that the trade of the region will receive such an impetus, as will place it in advantageous contrast with the most flourishing coal region of the country.

In addition to the advantages which this coal district already possesses of having an inexhaustible supply of coal, the quality of which is at least equal to any other, and the facility of reaching market as cheaply as from any other—there is a strong probability that it will be the first which will be brought in connection by railway with New York.

The Summerville railroad is now nearly completed from Elizabethtown to Easton. A railway from Easton to Shipping Port, a distance of forty-six miles, is alone required to put this coal field in direct communication with the city of New York.—For this important link of railroad a charter has been obtained and a survey made which shows that a road can be made with great facility and with the most favorable grades, being all descending, and varying from one foot to eighteen feet per mile.—We do but express the general belief that the gentleman who is at the head of the enterprise "will never cease his exertions till they are crowned with success." Subscriptions to some extent have already been obtained, and there is no reason to doubt but that it will be speedily commenced and pushed forward to completion.—*Carbon Co. Gaz.*

The city councils of Pittsburgh have passed an ordinance authorizing the issues of bonds for the city subscription of $200,000 to the stock of the Ohio and Pennsylvania railroad, whenever called for by the directors. This will enable the company to put the road from Pittsburgh nearly to the State line under contract early in the coming year. The surveys are now progressing, and the location of this portion of the road will be finished before the close of the month.

Pittsburgh and Connellsville Railroad Company.—At an election for directors of the above named company, held at the office of the President, in Pittsburgh, on Monday the 3d of December, the following named gentlemen received 5962 votes, and were declared unanimously elected directors for the ensuing year:

Wm. Larimer, Jr., A. M. Hill, John C. Plumer, John Gebhart, Walter Bryant, Moses Hampton, Edward D. Gazzam, Wm. J. Totten, Henry Walters, Daniel Kaine, Hugh D. King, A. Stewart.

The election of directors is a mere matter of form for the purpose of saving the charter.—*Post.*

The corporation of Philadelphia have taken measures to place under contract the new bridge necessary to effect a proper connection with the eastern end of the Columbia railroad, some seven miles of which are being constructed on a new location, in order to avoid the present inclined plane. The bridge will cross the Schuylkill at Market street.

New York.

Buffalo and State Line Railroad.—The people of Western New York are moving in behalf of this road from Buffalo to the State line. Mr. Wallace, engineer, has just completed the survey of two distinct lines on the ronte, and the estimates for its construction are very liberal. The main features of the Buffalo and State line road are thus noticed by the Buffalo Commercial:

The plan proposed, is to build a double track at each station, and on the curved line, so that trains running in opposite directions may always run on separate tracks, on such portions of the road.

A station house will be located at each bend in the main line, near or exactly over the point where the tangent lines intersect, and the change of course in all cases is so small that the track will pass immediately in front of the buildings.

A station house will also be located at each end of the curved line where the double track terminates. The average distance between each station it about seven miles.

This plan if carried out will be an improvement on single track roads, and will prevent those calamitous accidents from collisions which frequently happen, and supersede the necessity of a double track the whole distance, until the increase of business demands it.

It is considered a liberal estimate for the whole cost of the construction of the road and equipping it complete, at $1,000,000. The indications are encouraging that the stock will be immediately taken or at least so much of it as is necessary to prepare the road for the superstructnre. In fact, we understand that there are responsible men who stand ready to take the contract at one-half stock and one-half cash. That the stock will be good investment, there can be no doubt. Since the construction of this line has been entered upon in earnest the people of Pennsylvania and Ohio, along the lake shore, have taken hold of the matter, and we shall not be surprised to find ourselves whirled along the whole length of the southern shore of lake Erie, in a railroad car, within three years.

Erie Canal.

Canal Navigation Closed—Increase of Tolls.

The canals of this State close to-day, just as the business belonging to them had about terminated. The navigation was uninterrupted up to the hour of closing.

On no former occasion have the canals been in better or more constant working condition. And never has a season of navigation passed more pleasently, for forwarders and boatmen. The officers all along the lines have not only been efficient and faithful in discharging their duties, but attentive, civil and obliging to all who had business on the canals.

And we are gratified to learn that notwithstanding the depressed state of business during the cholera season, the canals have done well financially. The tolls of the present, exceed those of the past year. The amount collected last year was $3,245,-

662. This year the amount collected is $3,259,210. And in the mean time the work of enlargement has been steadily and advantageously progressing. The expense of repairs has been diminished and the canals are left in better order for resuming navigation than they have been at the close of any former year.—*Albany Journal.*

THE "RAILROAD FESTIVAL."

Some time since we stated that arrangements were being made for a grand railroad festival in Syracuse, which was to come off some time during the present month. The Syracuse Journal says the arrangements are now about completed. Nineteen railroads, embracing all in our State, and several out of it, are represented in the list of honorary managers, by their several officers. Some thirteen or fourteen hundred cards of invitations have been issued, and will be sent in different directions.—The railroad festival at Rochester, two years since, was a very pleasant gathering, and a creditable affair. The 18th of this month is the day named for the gathering at Syracuse.—*Albany Journal.*

Georgia.

Central Railroad.—The Savannah Republican of the 19th inst. says: We append the gross earnings of the road for the past eleven months; the comparison with the eleven months of the previous year, shows an increase of one hundred and twenty one thousand dollars, being over twenty five per centum of increase in the earnings of the road for that period.

	1847-8.	1848-9.
December	37,421 72	67,861 05
January	52,291 27	66,629 07
February	57,786 38	71,691 52
March	51,434 38	75,969 72
April	30,254 39	61,318 87
May	33,945 70	32,544 62
June	26,138 12	20,412 33
July	25,867 56	22,525 87
August	31,964 54	28,940 48
September	41,182 37	45,409 30
October	63,516 37	79,755 10
	451,802 81	573,054 93

Georgia Railroad.—The Augusta Chronicle and Sentinel of the 9th inst. gives the earnings of the Georgia railroad during the seven months ending 31st August, 1849, compared with the same period of 1848. Also earnings of the road in the month of October, 1848 and 1849 compared.

	Passengers.	Freight.	Mail, etc.	Total.
1849	99,883 89	170,695 36	22,686 31	293,265 56
1848	96,800 51	148,206 47	22,215 39	267,223 37
Inc'se	$3,083 38	22,488 89	470 92	26,043 19
OCTOBER.				
1849	16,998 74	52,314 68	3,178 83	72,492 25
1848	14,003 66	41,851 46	3,526 73	59,381 85
Inc'se	$2,995 08	10,463 22	*347 90	13,110 40

* Decrease.

"The above figures show a very gratifying increase on the business of last year. The completion of the State road, and the rapid improvements of the up-country will add largely to the profits of the Georgia railroad during the next year."

Cars to Chattanooga.—On the 1st inst., as we learn from the Atlanta Intelligencer, the first train of cars that ever entered the boundaries of Tennessee, made its appearance in Chattanooga. It is estimated that there were upwards of three hundred persons on board. On the arrival of the cars, a large procession was formed which proceeded to the river, where a prayer was offered up by the Rev. D. Talmadge, President of the Oglethorp University. After several elegant addresses were delivered, the Chief Engineer, assisted by Dr. Smith, of Chattanooga, as cup bearer for the occasion, and a large number proceeded to mingle the waters of the Tennessee with those of the free stone regions of Georgia, and the Atlantic, uttering the sentiment "that this commingling of the waters of South Carolina, Georgia and Tennessee, might tipify a union and fraternity of the citizens of those States as lasting as their railways."

Alabama.

Alabama and Tennessee Railroad.—We learn from the Mobile Planter that the directors of the Alabama and Tennessee railroad company recently held a meeting at Selma, at which it was resolved to prosecute the work with energy. It is the intention of the company to have at least that part of the route from Selma to Montevallo completed and in full working condition within twelve months.—A portion of the road is already graded, and when completed to Montevallo, a distance of about fifty six miles, will tap the great southern coal fields at the most convenient and central point for opening a large coal trade with the Gulf of Mexico. The road will thus have constant employment throughout the year, and must, from the nature of its position and business, be one of the best paying roads in the Union, or elsewhere. Finished to Montevallo, the entire route to Gadsden will be speedily completed, and develope, within a short time, the vast resources of a large and rich section of our State now cut off from the usual facilities of commerce and travel.

At this meeting of the directors the post of chief engineer of the road, we are pleased to learn, was tendered to Lewis Troost, Esq., of this city. Mr. Troost made the first reconnoissance of the Mobile and Ohio railroad, and has subsequently been employed as assistant engineer on the road. In both cases he has discharged his duties to the entire satisfaction of the company, and with credit to himself. In his new employment he will without doubt meet the just expectations of the friends of the Alabama and Tennessee railroad.

Finances of Alabama.

One of the most gratifying facts that can come to the knowledge of the people, is the one made known by the Report of Mr. Lyon, bank commissioner, recently presented to the legislature, showing that the finances of the State are in a much better condition than has generally been supposed, and that there is no danger that Alabama will ever repudiate a dollar of her foreign debt.

The following statistics we condense from the report:

At the passage of the act of February 6, 1846, to regulate the affairs of the State bank and branches,

Our foreign debt was	$9,170,555 53
Bonds since paid by commission	2,476,666 57
Leaving amount of bonds outstanding Nov. 1st, 1849	6,693,888 96
From this deduct U. S. treasury notes owned by the State, bearing 6 per cent. interest	1,100,000 00
Leaving bonds on which the State now pays interest	$5,593,888 98

The outstanding circulation of the bank and branches is $618,407. But as this will be mostly absorbed this year in payment of taxes, it need not enter into the calculation of our liabilities.

The interest on our foreign debt has been reduced from $469,659 86, to little more than half that sum—say $277,914 44.

The instalments of interest have been promptly paid as they fell due.

Such is the condition of our foreign debt, and the State has abundant cause to congratulate both the commissioner and herself, for the removal of so heavy a portion of this burthen from her shoulders. —*Montgomery Journal.*

Virgina.

Alexandria and Valley Railroad.

A large and enthusiastic meeting of the friends of this road was held at Strasburg, in Shenandoah county, on the 25th ult., at which Robert Jamison, of Alexandria, presided. George F. Hupp, of Shenandoah, and Naason Bare, of Rockingham, were appointed Vice Presidents, and John S. Calvert and George A. Hupp, of Shenandoah, Secretaries.

The following preamble and resolutions passed at the meeting will convey a good idea of the object of the meeting and the result of its proceedings.

It appearing to the committee that a convention of the friends of the Alexandria and Valley railroad was held at Front Royal, on the 15th day of May last, at which certain resolutions were passed, and certain committees appointed, and it further appearing that a committee appointed by that convention had been specially charged with the preparation of a memorial to the Legislature.

Resolved, That this convention heartily approve of the action of the convention at Front Royal, and will co-operate therewith to the fullest extent.

Resolved, That a committee of three persons be appointed to obtain such additional statistical information as may be required in reference to a memorial to the Legislature.

Resolved, As the opinion of this convention, that the Legislature should extend the most liberal support to those great lines of improvement, which tend to develope the abundant natural resources of the commonwealth.

Resolved, As the further opinion of this convention, composed of delegates from a large portion of the valley of Virginia, that the Alexandria and Valley railroad specially commends itself to the Legislature, for such liberal support—because it will occupy the only pass in the Blue Ridge, which can be traversed without a tunnel, and at a low grade, because it will tend to develope the resources of one of the most valuable and important portions of the State, because such connections, as are contemplated thereby, go far to destroy sectional jealousies and prejudices; and because an important sea-port town is thereby built up, within the limits of our own commonwealth.

Messrs. George F. Hupp, James Kenny, and L. W. Gamble were appointed a committee to furnish statistics of trade.

Messrs. W. H. Fowle and J. W, Foster were added on the part of this convention to the committee appointed by the Convention at Front Royal, to prepare a memorial to the Legislature.

Messrs. Naason Bare, of Rockingham, John W. Rice, of Shenandoah, Lewis McKenzie, of Alexandria, John R. Jackson, of Warren, Alfred Ball, of Prince William, (delegates from Fauquier to be appointed by central committee) were appointed a committee to attend to the interests of the Alexandria and Valley railroad, at Richmond.

Michigan.

We learn from the Chicago Tribune, of the 32d ult., that the Michigan Central railroad company are about commencing that part of the road between New Buffalo and Michigan city. The work of grading will be very light, and the bridging cheap. It is expected to have it completed from New Buffalo to Michigan city by the 1st of next July, when the steamboats will discontinue their trips to New Buffalo, and run no farther than the former place. It is also expected, that by the 1st of July, the section of the Buffalo and Mississippi railroad, between La Port and Michigan city, will be approaching completion. The legislature of In-

diana, in granting the right of way to the Southern railroad company, made the construction of this branch one of the first duties of the company.

Report on the Causes of Steam Boiler Explosions.*

"The Rumford committee having examined the paper submitted by James Frost, Esq., of Brooklyn, New York, and entitled, 'Description of the Causes of the Explosion of Steam Boilers, and of some newly discovered Properties of heat, and other Matters, for the purpose of showing that the Application of Steam for the Production of Motive Force is susceptible both of immense Improvement and Economy,' respectfully report:—

"The chief points which the author claims to have established are—

"1st. That steam of 212° Fahr., heated, out of contact with water, to 216°, doubles its volume;—and heated to 228°, increases its volume threefold.

"2d. That steam of low tension, heated to somewhere about 650°, is converted into another body, which the author calls 'stame,' and which, under favorable circumstances, becomes six times as effective as steam not so heated.

As, in the view of the author, the question of discovery rests upon the truth of the first of these two propositions, the attention of the committee has been particularly directed to its consideration. To this end, the apparatus employed by Gay-Lussac in his determinations of the tension of aqueous vapor at different temperatures was constructed, and a series of experiments made upon steam heated, out of contact with water, from the boiling point to 233°.6. The results arrived at were as follows:

"A volume of steam at 212°, Fahr., measuring 15·80 cubic centi-metres, or 1580 parts, heated to 216°, became 1600 parts, and heated to 228, became 4630 parts. According to Mr. Frost, 1580 parts at 212° should have become 3160 parts at 216 and 4740 parts at 228°. In tabular form we have, at

	Exp.	Frost.	Dif.
212°	1580	1580	
216°	1600	3160	1560
228°	1630	4740	3110

"The results for higher, intermediate, and lower temperatures are given in the accompanying table. The whole expansion of the steam, when heated from 212° to 228°, was a little more than one-thirtieth of its volume at 212°. According to Mr. Frost, it should have been more than ninety times as great as the committee found it to be.

"The experiments of the committee were made with steam under a pressure ranging from 24 to 24½ inches of mercury, that is, under less than atmospheric pressure. This condition could not influence the result unfavorably to the view of Mr Frost, since the less the pressure, the greater is the expansion with a given elevation of temperature.

Centi-grade. Deg.	Fahren-heit. Deg.	Vol-ume.	Centi-grade. Deg.	Fahr-heit. Deg.	Vol-ume.
112	233·6	1644	102	515·6	1600
111·5	232·7	1642	101·5	214·7	1598
111	231·8	1640	101	213·8	1592
110·5	230·9	1638	100·5	212·9	1588
110	230·0	1634	100	212.0	1580
109·5	229·1	1632	99·5	211·1	1574
109	228·2	1630	99	210·2	1560
108·5	227·3	1628	98·5	209·3	1510
108	226·4	1626	98	208·4	1430
107·5	225·5	1624	97·5	207·5	1280
107	224·6	1622	97	206·6	1130
106·5	223·7	1620	96	204·9	870
106	222·8	1618	95	203·0	650
105·5	221.9	1616	94	201·2	550
105	221·0	1614	93	199·4	350
104·5	220·1	1610	92	197·6	200
104	219.2	1608	91	195·8	150
103·5	218·3	1606	90	194·0	125
103	217·4	1604	70	158·0	000
102·5	216·5	1602			

"The committee deem it unnessary to consider farther the claims of the alleged newly discovered properties of heat, as set forth in the pamphlet of Mr. Frost.

E. N. HORSFORD, Chairman.

Wetting Bricks.—Few people except builders, are aware of the advantges of wetting bricks before laying them. A wall twelve inches thick, built of good mortar, with brick well soaked, is stronger, in every respect, than one sixteen inches built dry. The reason of this is that if the bricks are saturated with water they will not abstract from the motar the moisture which is necessary to crystallization, and, on the contrary, they will unite chemicaly with the mortar, and become as hard as a rock. On the other hand, if the bricks are put up dry, they immediately take all moisture from the mortar, and leave it too dry to harden, and the consequence is that when a building of this description is taken down it tumbles down of its own accord, the mortar falls from it like so much sand.

Postmaster General's Report.

The following is a brief abstract of the Postmaster General's Report:

The number of post offices in the United States, at the close of the year ending July 30th, 1849, was 16,747; 921 new offices having been established and 333 discontinued, making a net increase of 588. Postmasters appointed during the year 6333. Of these 183 were in consequence of deaths; 284 from change of sites of office; 2,103 removals; 11 commissions expired; 26 renewed commissions and 23 in consequence of becoming presidential, in consequence of income exceeding $1000; and 921 from erection of new offices.

The changes by the law of 1845 (the cheap postage law) have resulted beneficially to the Department. The cost of transporting the mail previous to June 1845, was eight cents one mill per mile.—It is now reduced to five cents six mills.

The number of mail routes in the United States on the first day of July, 1849, was 4,943, and the number of contractors 4,190. The length of these routes was 167,703 miles. On these the mail was transported 42,547,069 miles at a cost of $2,485,-515.

The gross revenue for the year, ending June 30, 1849, amounted to $4,905,176 28, derived from the following sources:

From letter postage, including stamps sold	$3,882,762 62
From newspaper and pamphlet postage	819,016 20
From miscellaneous items	3,254 21
From fines	43 75
From dead letter money sold	99 50
	$4,705,176 28
For the appropriation made by the 12th section of the act of 3d March, 1847, for mail service to the government	200,000 00
	$4,905,176 28

THE EXPENDITURES DURING THE YEAR WERE FOR

Transportation of mails	$2,577·409 71
Compensation to postmasters	1,320,921 34
Ship, steamboat and way letters	36,174 45
Wrapping paper	23,936 03
Office furniture	4,219 69
Advertising	61,813 32
Mail bags	20,276 38
Blanks	20,802 71
Mail locks, keys and stamps	4,386 50
Mail depredations and special agents	21,223 00
Clerks for offices, (offices of postmasters)	317,218 36
Miscellaneous payments	70,437 89
Post office laws and regulations	31 75
	$4,479,049 13
Excess of gross revenue for the year	$426,127 15
The appropriations under the 12th section of the act of 3d March, 1847, remaining in the Treasury undrawn, exclusive of the appropriation for the past year, already noticed, amounted to	$265,555 55
	$691,682 70

Thus showing the sum of $691,682 70 unexpended of the revenue of the past year, including the former appropriations granted to this department for the transportation of free matter to the department.

The expenses of the department for the current year are estimated as follows:

Expenditures as last year	$4,479,049 13
Additions—excess of cost of service in eastern section	96,981 00
New routes let in other sections	57,333 00
New service ordered	28,083 00
Expense for California	50,000 00
Expense of mail across Isthmus	5,692 00
Publishing new addition of post office laws	8,000 00
Other miscellaneous items	25,000 00
Whole expenditures of the service of the department for the current year.	$4,750,138 13

The revenue for the year 1849 was $3,882,762 from letter postage and sale of stamps, and $819,-016 from newspapers and pamphlets, being an increase of 14 2-10 per cent. in 1848. The Postmaster attributes a portion of this large increase to the retaliatory postage act, the correspondence growing out of the presidential election, &c., causes which do not now exist. He therefore finds his estimate of the income of the current fiscal year, on the basis of what is deemed a natural increase of nine per cent. as follows:

Revenue from postages, year ending June 30, 1848	$4,117,630 00
Add 9 per cent	370,587 00
Revenue for year 1849, by natural increase	$4,488,226 00
Add 9 per cent	403,940 00
Probable revenue for year ending June 30, 1850	$4,892,166 00
To this add balance on hand July 30, 1849	691,682 70
Appropriation for free matter for departments for year ending June 30, 1850	200,000 00
	$5,783,848 70
Deduct expenditures before stated	4,750,138 18
Leaving a balance on the 30th June, 1850 of	$1,033,710 57

North Carolina.

The Greensborough Convention.

The convention called together for the purpose of increasing the subscriptions to the stock of the N. Carolina Central railroad assembled at Greensborough on 29th ult. Among the names of the members we notice those of Gen. Saunders, Gov. Morehead, Gov. Swain, Judge Ellis and many other distinguished gentlemen. There were probably 150 delegates present, of whom Petersburg, Va., claimed five. The Hon. Calvin Graves presided. Stirring addresses were made by Gov. Morehead, Gov. Swan, Mr. J. A. Gilmer, Gen. Saunders and others.

We learn from the report of Gov. Morehead, chairman of the committee appointed to ascertain the amount of subscriptions, that only $190,800 had been unconditionally subscribed—the amount to be subscribed on the part of individuals to secure the charter is $1,000,000. In a subsequent part of the proceedings Mr. Gilmer introduced a proposition that the whole remaining stock should be divided into 100 parts, and that such members of the convention as were willing should take one or more such part, and to this proposition 51 signatures were obtained. Efforts were afterwards made to insure the whole amount, but they were unsuccessful in getting additional subscriptions, and those taken are not to be binding unless the whole am't should in like manner be pledged. Resolutions were adopted to hold conventions in each of the counties through which the road is to pass with a view of making up the deficiency.

* Proceedings of the American Association for the Advancement of Science. Second meeting held at Cambridge, Mass., Aug., 1849.

SUPPLY OF LONDON WITH WATER.

At the last returns there were 70,000 houses out of 270,000 that had no water supply whatever; and though it is asserted that the number since has diminished, the supply of water to the poor in general is so scanty in many districts, that it is practically a perfect mockery. Seventy thousand houses inhabited by the poor, with an average only of two families to a house, would give 700,000 persons who have to beg or steal water every day for the ordinary necessities of existence. Although the practice of reducing to figures and to a money value, the sanitary ills endured, is to a certain extent a pandering to the vicious system which prompts an Englishman always, when considering a new project, to regard it in a mere money point of view, still it has its benefits in being an *argumentum ad hominem*, of no inconsiderable value, in determining a speedy conclusion. Now, if the very hardness of the water of London alone leads to an outlay of soap and soda of, at the least double the amount absolutely requisite, and that amount be £630,000 it is surely worth while to determine whether an actual waste of £315,000 should be annualy tolerated in the metropolis. But if we embrace the moral and physical evils, and combine with them the sum of the pecunary loss entailed by the present scanty and intermittant supply of impure, often dirty, water to London, such an array of facts would stand forth as to cause every inhabitant to cry shame upon those whose duty it should happen to be to present a remedy for such a condition of things.—*Health of Towns Journal.*

Railroad Fares.—It is proposed, on the first of January next, to advance the fare on the four railroads, leading West and North from Boston, from 2 to 2½ cents per mile, except for package tickets and steamboat competition. After the first of January the rates on the seven railroads out of Boston, except for special trains, will average about 2½ cents a mile.

AMERICAN RAILROAD JOURNAL.

Saturday, December 15, 1849.

The Debts and Credit of Illinois.

The condition of the finances of this State are so complex, that they almost defy comprehension by any one who has not given them months of examination. Her bonds have been issued for over 20 distinct species of indebtedness which have undergone such a variety of legislative and financial mutations, and have passed into such a variety of hands, that the number of those who have been able to understand their condition, has diminished just about as fast as the parties interested in them have increased.

For the information of such as have not enjoyed any opportunities of investigating the subject, we give the following statement derived from an intelligent gentleman whose anthority is unimpeachable. It will be found sufficiently minute and specific for all practical purposes.

The exact amount of the indebtedness of the State is not fully known: but as nearly as can be ascertained it may be set down as follows, in round numbers:

The internal improvement debt	$6,000,000
Unpaid interest since July, 1841	3,000,000
The Illinois and Michigan canal debt	5,000,000
Unpaid interest since July, 1841	2,500,000
Other indebtedness, including unadjusted claims	1,000,000
Gross amount of indebtedness	$17,500,000

Of this amount of seventeen millions five hundred thousand dollars, eleven millions or over is bearing six per cent. interest—amounting annually to, say $660,000

The present moneys of the State, applied to the payment of interest is derived from a special tax of 1½ mill on the dollar of taxable property in the State; which raises annually about, say 120,000

Leaving annually unpaid $540,000

This latter amount is therefore annually swelling the debt, and although the State is now rapidly settling, and increasing in wealth, it cannot in many years so increase the revenues as to meet its aunual interest, and stop the accumulation.

In addition to the canal debt, as stated, a loan from holders of canal bonds was obtained, to the amount of $1,600,000, for the purpose of completing the canal. To secure this amount, and the bonds, which were registered by parties who made the loan, the canal and canal lands were placed in the hands of trustees, who have prosecuted the canal to completion, and have made sales of land to the extent of about $900,000, partly on a credit of three years. This amount, when collected, together with sales of the residue of the canal lands, and the receipts of tolls, it is probable, will pay off the loan within four or five years, and will then leave the receipts from the canal to be applied annually towards liquidating the arrears of interest on the registered canal bonds. The receipts from tolls on the canal, the present year, will not, it is estimated, vary much from $120,000; and after paying the current expenses of the year, will leave some $80,000 to apply towards the payment of the $1,600,000 loan.

It is possible that the profits of the canal will annually increase; so that it may safely be expected that after the $1,600,000 loan is paid, there will be $100,000 or more, annually, to go towards paying the arrears of interest on the registered canal bonds. This arrearage will exceed two millions of dollars, and it will consequently require the profits of the canal for a number of years to discharge it.

The unregistered canal bonds will have no share of the profits of the canal. Nor are they in any way secured by the canal or canal lands. They are, therefore, considered as the poorest class of Illinois securities, there being no provision for payments upon them, beyond the small amount which the 1½ mill tax annually provides.

In the new constitution of the State, which was adopted in 1848, an article provides a tax of two mills in addition to all other taxes, to be assessed and collected annually, and paid pro rata upon the principal of the internal improvement debt. This tax has not yet been assessed, but it will probably be levied next year, and paid over on the first of January, 1851, unless some other provision shall be made for the disposal of that fund. That this may be done, is not improbable, as at the recent extra session of the legislature a measure was brought forward, having for its object a change in the constitution, to authorise the diversion of the two mill tax, for the purpose of creating a sinking fund for diminishing the State debt. This measure has been adopted by the legislature, but will not become operative until it be acted upon by another session of the legislature, and afterwards approved by the people by a vote at a general election. It will require two or three years to accomplish the proposed change, and will consequently suspend any action relative to the present provision with regard to the two mill tax, until the amendment to the constitution shall have been acted upon.

The exact terms of the proposed amendment of the constitution we have been unable to learn, but the proposition as submitted to the legislature was that the fund created by the two mill tax "be used in such manner as may be prescribed by law, for the purpose of purchasing in open market any of the indebtedness of the State bearing interest, other than the canal registered indebtedness, the school indebtedness, and such other indebtedness as is not fully recognised by the laws of the State."

This measure, it was urged, would meet the views of the creditors of the State, and at the same time without in any way questioning the obligation of the State to pay in full the entire debt, enable her to reduce her indebtedness in a manner to make it certain that within a period of years, although remote, the indebtedness would be taken up.

The strict justice of this method of liquidating the debt may, in the minds of some, be questionable, but a careful examination of the position of the affairs of Illinois, and the operation of the sinking fund, applied in the manner proposed, will show that some similar plan is necessary to save the State from utter bankruptcy, and that this method will operate favorably upon the holders of bonds of the State, by furnishing an annual demand for a certain amount of those bonds, which the holders, by force of circumstances, or a desire to change their investments, may put upon the market, thereby preventing any serious depreciation in the market, and tending to produce competition and advance prices. And, on the other hand, by thus gradually absorbing the liabilities of the Siate, it secures to the permanent holders of the remaining bonds a certainty that they will ultimately be paid, and annually increase the payments of interest from the proceeds of the 1½ mill tax.

To persist in the course of policy marked out by the constitution, and follow the present plans for meeting the liabilities of the State, would seem to be the extreme of folly; as under the most favorable aspect the debt must continue to run, by the accumulation of the arrears of interest for years, untill the amount would become fearfully large, and perhaps beyond the hope of payment. But, under the new course of policy marked out by the proposed amendment to the constitution, it becomes clear that within a few years, any accumulation will cease, and the progressive reduction of the debt will finally fully discharge it.

Pennsylvania Railroad Co.

The annual meeting of the stockholders of this company was held on Monday in Philadelphia, and was numerously attended. The best spirit, says the North American, prevailed, and the annual report appeared to give universal satisfadtion.

Thomas P. Cope, Esq., was called to preside, and when the meeting was fully organised, the report of the board of directors was read by the president, Wm. C. Patterson, Esq. The presentation of the affairs of the company is most interesting and gratifying.

The fiscal year closed on the 31st of October last, and up to that date the treasurer's books showed the following state of affairs:

Received from subscriptions and other sources	$3,692,379	44
Amount disbursed	3,193,709	15
Leaving a balance of	495,670	29
If to this balance be added the amount of uncollected subscriptions, including the second subscription from the city of Philadelphia, about	1,900,000	00
There is the sum of	$2,398,670	29

applicable to the construction and equipment of the road.

The report of the superintendent of transportation shows that the most sanguine expectations have been realised on the small section of the road

now opened between Harrisburgh and Lewistown, and the arrangement made with the Harrisburgh and Lancaster railroad company, for running the cars and engines of this company over their road, has ministered not only to the benefit of the travelling community, but to the company itself. It has secured an increased rate of speed, at a reduced cost.

Arrangements have been made for the discontinuance of all operations upon the road upon the Sabbath, and the report expresses the hope that, "by the concurrent action of other companies and the State authorities, Pennsylvania will soon cease to be the northern frontier of Sabbath desecration.

The opening of the road, at the earliest practicable period, to a point near Holidaysburg, where it will connect with the Allegheny Portage railroad, has been an object of great solicitude to the board, not less on account of the important bearing it will have upon the trade of Philadelphia, than from a firm conviction that the receipts of the road, when finished thus far, will afford the stockholders tangible evidence of the safety and productiveness of the capital they have invested in it.

The portion of the line from Harrisburgh to Lewistown was opened for travel on the 1st of September last, and "very rapid progress has been made on the sections between the mouth of the Little Juniata and the base of the mountains. The work upon the residue of the eastern division has been unavoidably retarded; the general prevalence of disease, during the past season, having disabled a large proportion of the laborers on the line, while it rendered it impossible to supply their places." This difficulty has, however, passed away, and the work is being pushed forward with all proper energy. A justly deserved compliment is paid to the skill and zeal of J. Edgar Thomson, the Chief Enginer, and his assistants.

Having thus presented the actual condition of the road, and its contingents, the report of the board dwells upon the question of the policy to be pursued in future. It says:

"It is now for them (the stockholders) to determine whether the board shall, with the means in hand, finish the eastern division to the point of connection with the branch road to the Portage; and the western division to a point in Westmoreland county, whence a convenient road, about one mile in length, can be opened, at a small expense, to the Southern turnpike, and then pause until the necessities of the trade, and the income to be derived from the road in its unfinished state, shall induce such further subscriptions as may be required to complete it; or by a vigorous effort at this time, secure the means of making a continuous route to Pittsburg as rapidly as it can be built—due regard being had to economy and durability."

It is argued that if the former course be adopted the company will have a well constructed road free from debt, of great public utility, and capable of producing, under judicious management, an ample return for the capital employed. If the latter is resolved upon, the income upon the present investment will be materially enhanced, and the purpose for which the road was originally projected—of securing to the cities of Philadelphia and Pittsburgh the largest possible share of the western trade, with the incidental advantages accruing therefrom to the State of Pennsylvania—will have been achieved, beyond the possibility of doubt, in the possession of the first railroad from the seaboard to the Ohio river.

According to the estimates of the chief engineer, which it is confidently believed will exceed, rather than fall short of the actual result, the cost of constructing the road will be as follows:

Eastern division	$4,180,000
Western division	2,865,000
Amount required for the equipment of the road, prior to the year 1851	540,000
	7,585,000
To meet wnich there is a reliable subscription (including a further subscription of $1,000,000 by the city of Philadelphia) of	5,600,000
Leaving a deficiency of	$1,985,000

This deficiency, it is believed, can, by extraordinary exertions be made up. An effort is now in progress at Pittsburgh, under favorable auspices, to procure subscriptions to the amount of $500,000. It is hoped that the recent demonstrations of popular feeling in favor of liberal subscriptions by the municipal corporations of the county of Philadelphia will produce from that source an equal sum of $500,000. This would leave for private subscription in the city of Philadelphia and elsewhere, the sum of $985,000, which by proper effort can be secured for the company.

The opening of the road to Huntingdon, during next Spring will, it is confidently expected, concentrate upon it a large proportion of the western travel that has heretofore taken the stage and railroad route, via Cumberland and Baltimore, to the city, and when finished to the mountains, in August, it must, of necessity, become the great thoroughfare from the Atlantic seabord to the west and southwest.

The remainder of the report is devoted to an argument setting forth the brilliant, but truly reasonable prospects that exist for the road, and it closes with a justly deserved compliment to the late president, Samuel V. Merrick, Esq., who was obliged, from personal considerations, to resign the post he filled so capably.

After transacting some further business the meeting adjourned.

The following persons were elected directors for the ensuing year, at the meeting of the stockholders on Monday last:

William C. Patterson, Samuel V. Merrick, David S. Brown, Stephen Caldwell, George W. Carpenter, Thomas T. Lee, Washington Butcher.

Iron Workers' Convention at Albany.

The convention met at Albany on the 12th inst., pursuant to notice, and organized by the choice of the following persons as officers, viz:

President—Erastus Corning, Albany.

Vice Presidents,

Alexander J. Coffing, Dutchess.
Gouverneur Kemble, Rockland.
James Sterling, Jefferson.
James S. Whallon, Essex.
E. B. Judson, Onondaga.
C. Cayler, Columbia.

Secretaries,

H. C. Seymour, Rockland.
A. J. Rosseau, Rensselaer.
Francis H. Jackson, Essex.

The following are the names of the delegates in attendance:—

Albany—Franklin Townsend, J. McD. McIntyre, Lewis Benedict, Arch'd. McIntire, Erastus Corning, John Townsend.

Columbia—Lemuel Pomeroy, C. C. Alger.

Clinton—James Rogers.

Dutchess--Noah Gridley, Columbus Reed, Luther S. Dutcher, Alexander J. Coffing, H. A. Webb, W. A. White, Orville Dakin.

Essex—James S. Whallon, Allen Penfield, C. D. Barton, Wm. H. Lowe, F. H. Jackson.

Jefferson—James R. Sterling.

New York—Thaddeus Sellick, J. T. Hodge, A. R. Wetmore, A. S. Hewitt.

Oneida—J. B. Armstrong, B. S. Seymour.

Onondaga—E. R. Judson.

Orange—Peter Townsend.

Rensselaer—L. G. B. Cannon, Joseph M. Warren, Day O. Kellogg, J. F. Winslow, John Hunter, H. Tator, A. S. Perry, Isaac B. Hart, James Forsyth, Geo. H. Cramer, L. G. Cannon, H. Burden, A. J. Rousseau, H. Ingles, Joel Mallory, D Southwick, Marcus Eldridge, Harry Fisher.

Rockland—H. C. Seymour.

Saratoga—John Cramer.

Ulster—Wm. Burt.

Warren—Wm. S. Stevens.

Vermont—Winter H. Holly, Luman Munson, C. C. Hinsdale, Morton Brock.

New Hampshire—John L. Hayes.

Massachusetts—John H. Coffing, N. S. Palmer, Benj. Cole.

Connecticut—George Coffing, Robert Bostwick, A. H. Holly, Horace Langdon, Edwin B. Williams, Gustavus Almet.

New Jersey—Peter M. Ryerson.

Pennnsylvania—Pred Overman.

Illinois—Churchill Coffing.

Mr. Lowe, of Essex, moved the appointment of a committee of three, to prepare a memorial to Congress, praying an increase of duty on iron. Carried, and the following committee appointed:—Messrs. Lowe of Essex, Hodge of New York, and McIntyre of Albany.

Mr. Hodge, of New York, moved the appointment of a committee of seven to prepare and report statistics to the convention. Adopted, and the following gentlemen named as such committee, viz: Messrs. Hodge, of New York, Rogers, of Clinton, Winslow of Rensselaer, Jackson, of Essex, Sterling, of Jefferson, Bushnell, of Dutchess, and Leavenworth, of Ontario.

Mr. Barton, of Essex, moved the appointment of a committee of seven to report the names of seven gentlemen to represent the iron interests of this State at Washington during the present session of Congress; and the chair designated the following as such committee, viz: Messrs. Barton of Essex, Davidson of Saratoga, Cannon of Rensselaer, Kingsland of Clinton, Reed of Dutchess, Stevens of Warren, and Pruyn of Albany.

Mr. Barton moved the reference of the letters read to the convention this morning, to the secretaries for publication.

The committee on address and resolutions was composed of Messrs. Winslow of Rensselaer, P. Townsend of Orange, Mr. Burt of Ulster, Webb of Dutchess, Judson of Onondaga, Dutcher of Dutchess, and L. G. B. Cannon, Rensselaer.

Mr. Cannon, from the same committee, reported the following resolutions:

Resolved, that the convention regards the *protection of American labor* as one of the first duties of government, that the history of the protective policy in this country is the rise and growth of our manufactures and the triumph of American industry, A policy having for its object the just reward of labor and the elevation of the laboring classes; a policy which distinguishes justly between American labor and half paid and half fed labor of foreign countries; which remunerates American labor without injury to the consumer of its products, and upholds all the great interests of the country by giving well paid employment to our people, bringing wealth, independence and happiness to all.

Resolved, That we are not in favor of an excessive duty on foreign importions, but such a rate of uty as will enable us to enter into fair competition

with the foreign manufacturer, and such competition can only be secured by a system of *specific duties* laid upon foreign products.

Resolved, That the amount of duty on iron per ton, excepting the smaller sizes, collected under the present tariff for a period of twelve or fifteen months after its passage did protect the manufactures of iron in this country, for the reason that prices abroad ruled at a rate above their average value, and foreign iron could not be laid down here at a cost below a remunerating price to the home manufacturer. At the present time, and for the last 18 months, the foreign market has ruled at less than one half, diminishing of course the amount of revenue in the same proportion, thereby bringing the article into the country at about one half its cost in 1847. If these are facts, and the records of the trade show it, can the manufacture of iron be protected in this country, while the duty of one year barely protects, and the duty of the next is reduced one-half?

Resolved, (as the sense of this convention) That the manufacture of iron in this country requires *specific duties* for protection. That at least three parts out of four of the value and price of iron are made up of labor—the labor which digs, burns, cleans, blooms, smelts. forges and transports; and that the production of iron in this country, to any considerable extent must be abandoned unless the interest is protected, or the price of labor reduced to the foreign standard.

Resolved, That it is the duty of Congress, at the earliest practicable period, to revise and reform the tariff of 1846, so as to encourage the manufacture of iron by abolishing the system of *ad valorem* duties, and substituting therefor specific duties, which shall produce a healthy home competition, diminish prices and afford reasonable protection against foreign pauper labor.

Resolved, That our Senators and Representatives in Congress be requested to urge this subject upon the attention of Congress, and that they be requested to take all proper means to procure so important a revision and reform, affecting the interests of so large a body of their constituents.

Resolved, That in consequence of the peculiar tendency of the *ad valorem* system of duties, the poorest qualities of iron are largely introduced, to the great injury of the country, in place of the more useful and better qualities, these being more highly priced.

Mr. Barton, from the committee on that subject, moved to increase the number of delegates to Washington to ten. Carried; and

The committee reported the following names as such delegates:—

Elisha Peck, of New York; John Cramer, of Saratoga; Erastus Corning, of Albany; Peter Townsend, of Orange; Alex. J. Coffing, of Dutchess; C. C. Alger, of Columbia; J. F. Winslow, of Rensselaer; James S. Whallon, Allen Penfield, C. D. Barton, Essex.

Mr. Barton moved the appointment of the following gentlemen as a State Corresponding and Finance Committee, viz:

Erastus Corning, Lewis Benedict, of Albany; J. F. Winslow, J. M. Warren, L. G. B. Cannon, Rensselaer.

The convention then adjourned to 7 o'clock.

EVENING SESSION—7 o'clock

Mr. Winslow offered the following resolution:

Resolved, That this convention fully appreciates the importance and value of the "*American Railroad Journal*," and particularly that department of it which treats of the Iron Manufacture of the Union, and most cordially recommend its support to the iron interests of the country, and we also add our approbation of the work upon the "*Manufacture of Iron*," by Frederick Overman, of Philadelphia, and commend it to the support of the friends of that interest.

Mr. Winslow sustained this resolution as due the publications named. Both of them contain matter of great importance to the trade. The Journal is a useful periodical, ably conducted and devotedly zealous in its advocacy of the great interests, to promote which this convention has met; and Mr. Overman's volume contains a vast amount of highly valuable theoretical and practical information.

The resolution was unanimously adopted.

Mr. Hodge expressed his thanks to the convention for the flattering notice of the "*Railroad Journal*," and trusted it might continue to merit the approbation it had elicited. He made a few interesting remarks on the general subject before the convention; and reported, on behalf of the committee, a petition to Congress, praying a modification of the existing tariff.

Mr. Winslow, from the above committee, reported the following

ADDRESS.

The committee appointed to report a series of resolutions and an address upon the present condition of the Iron trade of our State and Union, beg leave to submit: That they find this important interest suffering and depressed to an unexampled degree, by being brought into competition with foreign iron, which is admitted at so low a rate of duty under the Tariff act of 1846 as will if persisted in, utterly put an end to its production in this country, thereby causing ruin to the manufacturer, and depriving tens of thousands of persons of their accustomed employment. There is perhaps no department of industry which so much requires the fostering care of a government as the manufacture of iron—none which furnishes so large a share of the national defence—none that is so emphatically the embodiment of labor—and certainly none in this country which suffers to the same extent when brought into conflict with foreign labor—chiefly for the reason that the average rates of labor in this branch of trade in England are, as compared with those in this country, as one is to 3 or 3½, and not until the rewards of labor here rule as low as there (a state of things which no lover of his country would wish to behold) can we prosecute the business of iron making without protection. Nor is the difference of labor the only advantage which England has over us; with her, originated, in a good degree, the proces of making iron with mineral coal, and this improvement was not introduced into this country until nearly forty years after its discovery there—affording her ample time and opportunity for the attainment of a high degree of perfection in this art. Within her circumscribed limits are found in great abundance and in juxtaposition, the coal, the ore, and the solvents necessary for its reduction. She has a dense and dependent population, with capital and skill to combine and control the resources which nature and a favoring government have so bountifully bestowed upon her—which, with her peculiar maratime position gives her easy access to all the markets of the world.

In this country we have, it is true all the materials for the manufacture of iron, but they are rarely found in localities from which the avenues for its transit to market are yet completed, and as a consequence, its manufacture cannot at present be prosecuted at those localities, and the iron laid down in our sea-board markets at as low a rate as from like establishments in England and Wales.

Neither have we capital in such abundance, or which is satisfied with like returns for its use; nor a population so entirely dependent upon the caprices of capital and employers, or so depressed as to be content to receive as a boon whatever the necessity of their principles, or inordinate competition in trade may demand. We have here no hereditary rights—no distinctions of birth—but all inherit the right to labor, and if the rewards of that labor are not such as afford a respectable livelihood, and enable us to train up and properly educate our children to become actors in the duties and responsibilities of citizenship, we have the oppertunity of becoming possessors of the soil, which, by manorial rights, is denied to the laboring population of England. The same classes, therefore, in this country are not *compelled* to yield to the exactions of employers or the emergencies of trade; and if told that the products of pauper labor from abroad conflict with the products of their labor in our markets, and to continue that production, the cost thereof, i. e. the labor must be reduced correspondingly, they are not *obliged* to submit; but so long as land is so abundant and so cheaply obtained, they have the tempting alternative of emigration and of becoming owners and cultivators of farms, held to them, thus leaving the capital invested in manufacturing wholly unproductive, whereby the farmer, the gardener, and the grocer lose them as customers, to meet them as rivals, and preventing "the productions of the land from being consumed upon the land."

There are in this country east of the Alleghany mountains, thirteen rolling mills employed in the manufacture of railroad iron, and some four or five west of the boundary, At a very low estimate, these seventeen or eighteen mills are capable of making 100,000 tons of rails per annum, worth at the average price for the last four years, about six and a half millions of dollars. At this time but two of these establishments are in operation, and these two but partially at work; all the others are wholly silent, and the thousands of persons who two years ago were fully employed therein, and adequately compensated, are now without employment, exposed to dissipation, to crime and the numberless immoralities that always follow in the wake of idleness. It is a fact worthy of special note that all these establishments are the offspring of the tariff law of 1842, up to which time railroad iron was admitted into this country free of duty, and was unknown as an article of American manufacture; but the duty of 25 dollars per ton imposed by that act was marked by its immadiate and sufficiently extended manufacture to meet the demands for railroad construction, and confessedly of a far superior quality to that obtained from abroad. Within the six months ending on the 1st of September last, there was imported into the single port of New York from England nearly 34,000 tons of railroad iron, and about 75 tons of other descriptions, 39,000 of which was pig iron, and the money to pay therefor sent out of the country, the practical effect of which upon the labor of the country is a direct and positive loss, as we have the materials, the labor and the machinery *waiting* to furnish it, but which have been suffered to stand idle, while we have gone to England to obtain that of which we have a surplus at home, and of far better quality. In this sense, then, the loss to the country is as real as though the same amount of money had been buried in the ocean—even worse, it is a loss of the money we ought to have earned and a loss of the money it cost to support the labor that is *waiting* for employment. Had that money been kept at home it would have circulated throuhhout the various channels of trade and enterprise, making active and vigorous the places that are now desolate and languishing. According to the census of 1840, the whole annual value of iron made in the United States at that time was, when in market, $25,765,330.

Whole amount paid for labor in the manufacture of iron in the U. States in 1840, $18,762,990.

The number of men employed and the women and children dependent upon iron making for their support, was estimated to be 257,025 souls.

The value of agricultural products consumed during the same year by these persons was $11,726,766.

Capital employed in the manufacture of iron, inclusive of wood-lands and mines of iron and coal, estimated in 1840, $30,500,000.

Since the census of 1840, we have no authentic data by which to ascertain the increase in this department of manufactures; but from the time of the passage of the tariff of 1842 up to 1847, the rate of increase was largely beyond all former precedent, and we think we are warranted in supposing that on the 1st of January, 1848, the value of iron of American make was forty millions of dollars, and the amount of capital invested above fifty millions, an increase of at least 66 per cent. in 8 years. This prodigious impulse was given to the business by the tariff law of 1842, and was accompanied by a marked reduction in the prices of the manufactured article, consequent upon increased competition, while the rates of labor were fully sustained; showing, beyond dispute, that protection to the manufactured article is a boon to the labor of the land. In proof of this assertion, your committee cite a fact well known to every member of the trade, viz: that for a period of 16 years, commencing with 1830 and ending with 1846, an era

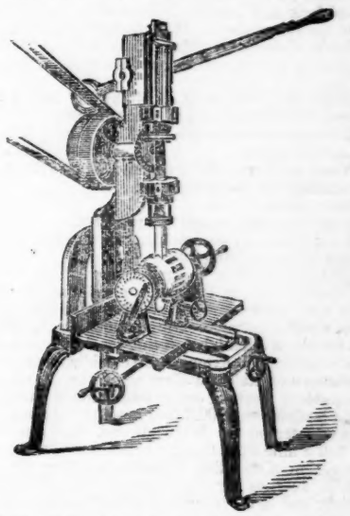
of high protective duties, the prices paid for ton work in the different iron works throughout the country were not reduced one per cent.; in many cases they advanced; while during the same period the market prices for manufactured goods steadily declined, until in 1846 some descriptions reached a point as low as 50 per cent. below the rates of 1830, thus establishing by experience, that the labor of the country is immediately and almost solely benefitted by the imposition of duties upon goods of foreign make; and proving, likewise, that employers in this country cannot, as in England, make the prices of labor bear a corresponding rate with the market value of the articles produced by that labor.

The value of the coal and the ore in the earth constitutes but a very small portion of the value of the manufactured iron. At favorable localities this is as 1 to 60, or nearly so; and is probably less in this country than in England, as they exist in greater variety and abundance, and their geological position being more generally favorable for extraction, and the lands containing them not burthened with onerous "lordship rights, royalties or government taxes." The residue of the cost of a ton of iron is made up of wages for mining, carriage to works, wages and waste of material incident to the processes of manufacture, transportation to market, (and this is only another form of labor) interest upon capital employed, constituting an almost entire whole of manual labor; for although machinery is employed in many of the manipulations, still the aid it affords is incidental to and requires great physical *adult* labor for the accomplishment of its purpose. In affording protection, therefore, to the iron manufacture of our country, it resolves itself into a mere question of fostering and sustaining our own domestic labor, and every dollar that is imposed in the form of a duty upon foreign iron, at least 80 parts of it is a contribution to American industry; and this in turn is paid to the farmer, the gardener, the schoolmaster, and other purposes that enter into the support of the household; but if withheld, then the same amount is given to foreign laborers, and the remaining 20 parts which make up the 100, is taken from the owners of the raw material, the proprietors of the works, and those who transport the produce to market, and goes to enrich like persons abroad.

Many proofs might be adduced to show that it is an appeal in behalf of labor which we make; but need we amplify? need we array figures and quote authorities to convence consumers that though foreign iron is nominally cheap, it is really dear?—Facts and statistics by the acre could be collated to prove that all that any nation (or person) may make by buying foreign goods cheap, it loses ten times over by the decline of property, product or labor. How just and comprehensive, as well as pertinent to the views entertained by your committee, is the following extract of a report upon the protective policy made to Congress in 1809, by Mr. Newton, of Virginia. He says: "A nation erect a solid basis for the support and maintenance of its independence and prosperity, whose policy it is to draw from its native sources, all articles of the first necessity." And says Mr. Dallas, in 1816, in his able report to Congress upon a protective tariff: "Although some indulgence will always be required to realise the national independence in the department of manufactures, the sacrifice cannot be either great or lasting. The inconveniences of the day will be amply compensated by future advantages. The agriculturalist, whose produce and whose flocks depend for their value upon the fluctuations of a foreign market, will have no occasion eventually to regret the opportunity of a ready sale for his wool or his cotton in his own neighborhood; and it will soon be understood that the success of the American manufacture, which tends to diminish the profit (often excessive profit) of the importer, does not necessarily add to the price of the article in the hands of the consumer." To the minds of your committee, the policy herein advocated is so sound and truthful, that none but those whose apprehensions are blunted by interest or uncandid views, can resist the conviction that no people can be great or prosperous, unless their interest be properly cared for, and their labor profitably employed. As an illustration of this, we need only point to Spain, to Portugal, to Turkey, and indeed to any government that has made "free trade" its policy, and looked to other nations for the comforts and staples of life. Heaven forbid that those who come after us, should point to the policy of our own country in proof of the enervating and ruinous effects of depending upon Europe for the products of mechanical labor! In the judgment of your committee, the tariff law of 1846, in its application to foreign iron, is mainly objectionable by reason of its ad valorem feature. Herein it works wrong and injustice, both to the honest importer of foreign iron, and to the home producer, exposing the former to unfair and unequal valuations from rivals of loose principles, and withholding from the latter protection when the price is low abroad, and when most needed, and subjecting him to frequent and at times ruinous fluctuations of prices in foreign markets, thus making the revolutions and disturbances of European governments as disastrous to our trade and industry as to their own. Had the rates of duty which were collected under this law at the time of its enactment been made specific, all reasonable protection would have been extended to the industrial interests of the country! and if now substituted, with perhaps some additional discriminations in favor of the smaller sizes of iron, the wishes of a large majority of the persons interested therein, we believe, would be realised. It is due, perhaps, to the friends of, and parties interested in other branches of American manufactures, not represented here, to refer to the peculiar character of this convention, and to its smmingly isolated composition, by way of removing any misapprehension that may arise from its apparently sectional character. Our explanations are cheerfully given, and we believe will be satisfactory to all. The iron manufacture of our state is a leading one, involving the capital as well as the welfare of a larger number of persons than any other individual pursuit, and while it was thought by those who have a deep concern in its prosperity, that its condition and claims would be the best considered and represented by a convention composed exclusively of persons engaged therein; still, we do not indend to urge upon Congress the consideration of our interests, to the exclusion or at the expense of others. On the contrary, we hope to meet in our efforts before that body, the representatives of the various industrial interests of the Union, and to receive from them that aid and co-operation which, as members of one common family, and the friends of a system as a whole, we owe one another. We feel that their cause is our cause, their interests our interests, and "If one member suffers all the members suffer with it; and if one member be honored, all rejoice."

In conclusion, your committee beg leave to add, that with a somewhat intimate acquaintance with the subject committed to them, and a careful examination into the condition of the interest here represented, we feel safe in asserting that of the large amount of machinery in this country for the manufacture of iron, not more than 33 per cent. thereof is in operation at this time, and this proportion is daily diminishing, and a considerable share ol this is kept in motion more for the sake of keeping up business organizations than from any profit derived from it. We too often hear of the disastrous consequences to our brethren in their struggles to sustain themselves in the unequal conflict with England under our ad valorem Tariff.—Too often are we invited to the sale of iron establishments, "brought to the hammer" after years have been consumed in building up a business, and which was called into existence by the hopes and allurements of what once seemed a permanent protective policy, but which, instead of being stable and unform, has halted and fluctuated between excessive protection and the almost total abondonment thereof. We think we speak the sentiments of our craft, when we say that we do not desire a rate of duty upon foreign iron which will prohibit its introduction from abroad, but we only ask that such discriminations be made as will recompense and elevate our own working population beyond and above the poorly-paid laboring classes of Europe, and enable them to participate not only in the necessaries, but also in the comforts and accomplishments of life. In this way we may ennoble labor, and open to its votaries the paths of education, intelligence and subsequent usefulness. Unless we have reflected in vain, it is the industry of our country which is to ennoble it. Greatness with us is not entailed. He only is truly great who *works* his own way to distinction and eminence, and confers the greatest amount of real enjoyment upon his species. We have not in this country such enormous accumulations of wealth in the hands of individuals with which to monopolize any of the departments of trade; and which depends upon the omnipotence of capital for success; but we have a country rich in resources and a people gifted with abundant energies for their developement; and if not crippled by unwise legislation, the field of enterprise will be speedily occupied and the harvest of reward shared by the laborer and the husbandman, the merchant and the manufacturer, filling our land with an industrious and prosperous people, causing "the waste places to rejoice and the wilderness to blossom as the rose."

Capt. Alfred Swingle's PATENT BORING & MORTISING MACHINE.



The above Machine was invented by A. SWINGLE, of Texas, in 1846, and Letters Patent were taken out in July, 1848. As a labor saving Machine it stands unrivalled even in these days of improvements. Its uses are innumerable; it may be successfully applied to Doors, Sashes, Carriages, Wheel-Hubs, and in fact to all kinds of work where the Auger and Chisel can be brought to bear.

The only limit to the speed of the working of this machine is the heating of the tools used. It will perform at least the labor of twelve men, and in vastly better manner, and can be worked equally well by steam power or by hand. It has been used and has given universal satisfaction.

For further information apply to H. B. TEBBETTS, 40 Wall St., New York, to whom all orders are to be addressed.

New York, December 15, 1849.

The New York Iron Bridge Co.

LATELY KNOWN AS

Rider's Patent Iron Bridge Co.

THE Company which has hitherto furnished these Bridges, under the patent granted to the late Nathaniel Rider, deceased, have become satisfied that all the principles embraced in their construction, are included in a previous patent, granted in the year 1839, to Col. Stephen H. Long, of U. S. Engineers, and by him designated as "Long's Suspension Bridges," and have therefore made an arrangement with Col. Long, by which they have secured the exclusive right to make and vend these Bridges throughout the whole United States.

The only change consequent upon the new arrangement will be found in the name and style of the Company. The parties composing it being the same, the construction of the Bridges will be essentially the same.

August 4th, 1849. M. M. White, Agent,
au7tf No. 74 Broadway, New York.

CUT NAILS OF BEST QUALITY, BAR IRON (including Flat Rails) manufactured and for sale by FISHER, MORGAN & CO.,
75 N. Water St., Philadelphia.

Wanted,

A Second Hand Locomotive, weighing from 10 to 12 tons. It is required that in answer, it will be stated, whether the engine has inside or outside connections—the price of the same delivered at Portland, Maine, and terms of payment expected. Address

VIRGIL D. PANIS,
President Buckfield Branch Railroad,
Portland, Maine.

November 10, 1849. 3t45

PATENT MACHINE MADE HORSE-SHOES.

The Troy Iron and Nail Factory have always on hand a general asssortment of Horse Shoes, made from Refined American Iron.

Four sizes being made, it will be well for those ordering to remember that the size of the shoe increases as the numbers—No. 1 being the smallest. P. A. BURDEN, *Agent*,
Troy Iron and Nail Factory, Troy, N. Y.

Norwich Car Manufactory FOR SALE.

WILL BE SOLD at public auction on the premises, on Wednesday, the 2d day of January next, at 10 o'clock A.M., the entire establishment and property of the Norwich Car Manufactory, consisting of

1 Brick, slate roof building, 50 by 150 feet, 2 stories, used for setting up cars, cabinet work, upholstery, etc.
1 Brick, slate roof building, 40 by 190 feet, 1 story, used for blacksmith and machine shop.
1 Brick, slate roof, engine and dry house, 30 by 40.
1 Lumber house.
2 Wood buildings, 50 by 64, and 54 by 120 feet, for painting and finishing cars.
1 Barn, 18 by 28 feet.
1 Wood dwelling house, 21 by 28 feet.
1 Brick block, six tenaments, two stories.
A number of building lots.

Together with all of the machinery, tools and fixtures connected with the same, consisting of—steam engine and boilers, several plaining and sawing machines, turning lathes, boaring, punching, morticing, and a variety of other labor saving machines, constituting as complete and extensive an establishment for the manufactory of Railroad Cars as any in the country, and capable of working one to two hundred hands, and doing a business of $200,000 or more per annum.

It is situated on the Norwich and Worcester Railroad, half a mile from the city of Norwich, at the head of navigation of the River Thames, affording the most desirable facilities for the transportation of cars and materials, and in the immediate vicinity of various and extensive manufacturing and mechanical establishments. It has been in operation about two years, several of the buildings having been completed the present year. The whole, with the exception of the vacant lots, is leased on favorable terms for four years from February next. For further information apply to J. G. W. TRUMBALL, WALTER LESTER. } Trustees

October 24, 1849.

BY FERDINAND E. WHITE.
STORE NO. 22 LONG WHARF.

Valuable Real Estate in South Boston.

On WEDNESDAY, December 19, at 12 o,clock, M. on the premises.

ALL the Property of the MASSACHUSETTS IRON COMPANY, consisting of their Two MILLS, situated on Boston Harbor, at South Boston. Each Mill is 214 feet by 174, including Sheds. The two contain 15 double Puddling Furnaces, and nine Heating Furnaces.

There are two trains of Rolls in each Mill, altogether capable of manufacturing 1000 tons of rails per month. They are well located for the receipt and delivery of iron from vessels, with every convenience usually attached to such an establishment. There is connected with it, and will be sold at the same time, about 417,000 feet of upland, on which are erected, besides the mills, four blocks, containing each four brick Dwelling Houses for workmen; a wooden Counting Room, with Dwelling adjoining; a horse stable, and a coal shed 210 feet long by 70 feet wide, now containing 3100 chaldrons Pictou Coal, and 923 tons of Pig Iron.

The terms of sale will be made liberal. For further information apply to B. T. REED, Esq., or to the Auctioneer.

December 1, 1849.

IRONDALE PIG METAL, MANUFACTURED and for sale by the Bloomsburg Railroad Iron Co.
DUDLEY FISHER, Treasurer.
75 N. Water St., Philadelphia.

NOTICE TO

Superintendents of Railroads.

TYLER'S PATENT SAFETY SWITCH.—The undersigned would respectfully call their attention to his Patent Safety Switch, which from long trial and late severe tests has proved itself perfectly reliable for the purpose for which it was intended. It is designed to prevent the train from running off when the switch is set to the wrong track by design or accident. The single rail or gate switch is established as the best and safest switch for the ordinary purpose of shifting cars from one track to another, but it is liable to the serious evil of having one track open or broken when connected with the other. My improvement entirely removes this evil, and while it accomplishes this important office, leaves the switch in its original simplicity and perfection of a plain unbroken rail, connecting one track with the other ready for use.

The following decision of the Commissioner of Patents is respectfully submitted to Railroad Engineers, Superintendents, and all others interested in the subject. P. B. TYLER.

(COPY.)

UNITED STATES PATENT OFFICE,
Washington City, D.C., April 28th, 1846.

SIR: You are hereby informed that in the case of the interference between your claims and those of Gustavus A. Nicolls, for improvements in safety switches—upon which a hearing was appointed to take place on the 3d Monday in March, 1846, the question of priority of invention has been decided in your favor. Inclosed is a copy of the decision. The testimony in the case is now open to the inspection of those concerned.

Yours respectfully, EDMUND BURKE,
Commissioner of Patents.

To Philos B. Tyler.

Any further information may be obtained by addressing P. B. TYLER, Springfield, Mass., or JOHN PENDLETON, Agent, 149 Hudson St., New York.

34tf

Cop Waste.

CLEAN COP WASTE, suitable for cleaning Railroad, Steamboat and Stationary Engines, constantly an hand and for sale by

KENNEDY & GELSTON,
5½ Pine St., New York.

October 27, 1849, 3m

ENGINEERS.

Arrowsmith, A. T.,
Buckfield Branch Railroad, Buckfield, Me.

Bancks, C. W.,
Civil Engineer, Vicksburg, Miss.

Berrien, John M.,
Michigan Central Railroad, Marshall, Mich.

Buckland, George,
Troy and Greenbush Railroad.

Clement, Wm. H.,
Little Miami Railroad, Cincinnati, Ohio.

Cozzens, W, H,,
Engineer and Surveyor, St. Louis, Mo.

Davidson, M. O.,
Eckhart Mines, Alleghany Co., Maryland.

Fisk, Charles B.,
Cumberland and Ohio Canal, Washington, D. C.

Felton, S. M.,
Fitchburgh Railroad, Boston, Mass.

Floyd-Jones, Charles,
South Oyster Bay, L. I.

Gzowski, Mr.,
St. Lawrence & Atlantic Railroad, Montreal, Canada.

Gilbert, Wm. B.,
Rutland and Burlington Railroad, Rutland, Vt.

Grant, James H.,
Nashville and Chattanooga R. R., Nashville, Tenn.

Harry, P.,
Binghamton, New York.

Holcomb, F. P.
Southwestern Railroad, Macon, Ga.

Higgins, B.
Mansfield and Sandusky Railroad, Sandusky City, O.

Johnson, Edwin F.
New York and Boston Railroad, Middletown Ct.

Latrobe, B. H.,
Baltimore and Ohio Railroad, Baltimore, Md.

Miller, J. F.,
Worcester and Nashua Railroad, Worcester, Mass.

Morris, Elwood,
Schuylkill Navigation, Schuylkill Haven, Pa.

Morton, A. C.,
Atlantic and St. Lawrence Railroad, Portland, Me.

McRae, John,
South Carolina Railroad, Charleston, S. C.

Nott, Samuel,
Lawrence and Manchester Railroad, Boston,

Reynolds, L. O.,
Central Railroad, Savannah, Ga.

Roebling, John A.,
Trenton, N. J.

Roberts, Solomon W.,
Ohio and Pennsylvania Railroad, Pittsburgh, Pa.

Robinson, James P.,
Androscggin & Kennebec Railroad, Waterville, Me.

Schlatter, Charles L.,
Northern Railroad (Ogdensburg), Malone, N. Y.

Stark, George.,
Bost., Con. and Mont. R. R., Meredith Bridge, N. H.

Steele, J. Dutton,
Pottstown, Pa.

Trimble, Isaac R.,
Philad., Wil. & Baltimore Railroad, Wilmington, Del.

Tinkham, A. W.,
United States Fort, Bucksport, Me.

Thomson, J. Edgar.,
Pennsylvania (Central) Railroad, Philadelphia.

Whipple, S.,
Civil Engineer and Bridge Builder, Utica, N. Y.

Williams, E. P.,
Auburn and Schenectady Railroad, Auburn, N. Y.

Williams, Charles H.,
Milwaukie, Wisconsin.

BUSINESS CARDS.

DUNLAP'S HOTEL,
On the European Plan,
NO. 135 FULTON STREET,
Between Broadway and Nassau St.,
NEW YORK.

Manufacture of Patent Wire ROPE AND CABLES,
For Inclined Planes, Suspension Bridges, Standing Rigging, Mines, Cranes, Derrick, Tillers, &c., by JOHN A. ROEBLING, Civil Engineer,
TRENTON, N. J.

Samuel D. Willmott,
MERCHANT, AND MANUFACTURER OF
CAST STEEL WARRANTED SAWS,
IMPORTER OF THE
GENUINE WICKESRLY GRINDSTONES,
NO. 8 LIBERTY STREET,
NEW YORK.

Doremus & HarriS,
ANALYTICAL & CONSULTING CHEMISTS,
179 BROADWAY, NEW YORK.
SCHOOL OF CHEMISTRY.

Dudley B. Fuller & Co.,
IRON COMMISSION MERCHANTS,
No. 139 GREENWICH STREET,
NEW YORK.

Railroad Car Manufacturer's Furnishing Store.

F. S. & S. A. MARTINE,

IMPORTERS AND MANUFACTURERS OF

RAIL ROAD CAR & CARRIAGE LININGS,

PLUSHES, CURTAIN MATERIALS, ETC.,
112 WILLIAM ST., NEAR JOHN.

3-4 and 6-4 Damasks, Union and Worsted; Moreens, Rattinetts, Cloths, Silk and Cotton Velvets, English Buntings

Walter R. Johnson,

CIVIL AND NINING ENGINEER AND ATTORNEY for Patents. Office and Laboratory, F St., opposite the Patent office, Washington, D. C.

S. W. Hill,

Mining Engineer and Surveyor, Eagle River, Lake Superior.

Starks & Pruyn,

MANUFACTURERS OF ALL KINDS OF

STEAM BOILERS,

52 and 54 Liberty, corner of Pruyn street

Nathan Starks, ALBANY Special Partner
Wm. F. Pruyn, R. H. Pruyn.

Iron Railing, Bank and Vault Doors, Iron Shutters Bridge and Roof Bolts, Heavy Jobbing and Forging of all kinds.

☞ For particularss ee Adv. in another column.

To Engineers and Surveyors.

E. BROWN AND SON Mathematical inst. makers No. 27 Fulton Slip, New York, make and keep for sale, Theodolites, Levelling inst., Levelling rods, Surveyors Compasses, and Chains, Cases of Mathematical drawing insts. various qualities, together with a general assortment of Ivory Scales and small insts. generally used by Engineers.

Samuel Kimber & Co., COMMISSION MERCHANTS

WILLOW ST. WHARVES, PHILADELPHIA.

AGENTS for the sale of Charcoal and Anthracite Pig Iron, Hammered Railroad Car and Locomotive Axles, Force Pumps of the most approved construction for Railroad Water Stations and Hydraulic Rams, etc., etc.

July, 27, 1849.

James Herron, *Civil Engineer*,

OF THE UNITED STATES NAVY YARD,
PENSACOLA, FLORIDA.,

PATENTEE OF THE

HERRON RAILWAY TRACK.

Models of this Track, on the most improved plans, may be seen at the Engineer's office of the New York and Erie Railroad.

To Railroad Companies.

—WROUGHT IRON WHEELS—
SAFETY AND ECONOMY.

NORRIS' LOCOMOTIVE WORKS,
SCHENECTADY, NEW YORK,

Are Manufacturing Wrought Iron Driving, Truck, Tender, and Car Wheels—made from the best American Iron. Address E. S. NORRIS.

May 16, 1849.

Machinery Warehouse.

S. C. HILLS, No. 43 Fulton street, New York, has constantly for sale Steam Engines, Boilers, Lathes, Chucks, Drills, Planers, Force and Suction Pumps; Tenoning, Morticing and Boring Machines, Shingle Machines, Bolt and Nut Machines, Belting, Oil, Iron and Lead Pipe; Rubber, Percha and Leather Hose, &c., &c.

S. C. H.'s arrangements with several machine shops are such that he can supply, at very short notice, large quantities of machinery.

November 23, 1849.

Cruse & Burke,

Civil Engineers, Architects and Surveyors,
Office, New York State Institution of Civil Engineers,
STATE HALL, ALBANY., N. Y.

Drawings, specifications and surveys accurately executed. Pupils instructed theoretically and practically at a moderate premium.

May 26, 1849.

Eaton, Gilbert & Co.,

Railroad Car, Coach and Omnibus Builders,
TROY, N. Y.

Hudson River Foundry, THOMAS & COLLINS,

130 Quay Street, Albany.

To Railroad & Navigation Cos.

MR. M. BUTT HEWSON, *Civil Engineer*, offers his services to Companies about to carry out the surveys or works of a line of Navigation or Railroad. He can give satisfactory references in New York City as to his professional qualifications; and will therefore merely refer here to the fact of his having been engaged for upwards of two years conducting important Public Works for the British Government.

Communications will find Mr. Hewson at the office of the Railroad Journal, 54 Wall Street, New York.

Alfred W. Craven,

Chief Engineer Croton Aqueduct, New York.

Manning & Lee,

GENERAL COMMISSION MERCHANTS,
NO. 51 EXCHANGE PLACE,
BALTIMORE.

Agents for Avalon Railroad Iron and Nail Works. Maryland Mining Company's Cumberland Coal 'CED —'Potomac' and other good brands of Pig Iron.

IRON.

Railroad Iron.

500 Tons, afloat, weighing 57 pounds per lineal yard, for sale by

COLLINS, VOSE & CO.,
158 South St.

New York, November 17, 1849. 1m46

Railroad Iron.

THE Undersigned, Agents for Manufacturers, are prepared to contract to deliver Rails of superior quality, and of any size or pattern, to any ports of discharge in the United States.

COLLINS, VOSE & CO.,
158 South St.

New York, November 17, 1849.

Railroad Iron.

1600 Tons, weighing 60½ lbs. per yard.
185 " " 57½ "
580 " " 53 "

of the latest and most approved patterns. For sale by

BOORMAN, JOHNSTON & CO.,
119 Greenwich street.

New York, Oct. 13, 1849.

Railroad Iron.

THE Undersigned have on hand, ready for immediate delivery, various patterns of Iron Rails, of best English make, aud manufactured in conformity with special specifications.

They offer also to import and contract to deliver ahead—on favorable terms.

DAVIS, BROOKS, & CO.,
68 Broad street.

New York, Oct. 11, 1849.

☞ Drawings and Patterns of the most approved Rail—and specifications of quality and make of same, are on hand at their office, for examination of parties who may desire to inspect the same. D., B. & Co.

Oct. 11, 1849.

MANUFACTURE OF PATENT WIRE ROPE and Cables for Inclined Planes, Standing Ship Rigging, Mines, Cranes, Tillers, etc, by

JOHN A. ROEBLING, *Civil Engineer*,
Pittsburgh, Pa.

These *Ropes* are now in successful operation on the planes of the Portage railroad in Pennsylvania, on the Public Slips, on Ferries, and in Mines. The first rope put upon Plane No. 3, Portage railroad, has now run four seasons, and is still in good condition.

Railroad Iron.

THE Undersigned offer for sale 3000 Tons Railroad Iron at a fixed price, to be made of any required ordinary section, and of approved stamp.

They are generally prepared to contract for the delivery of Railroad Iron, Pig, Bar and Sheet Iron—or to take orders for the same—all of favorite brands, and on the usual terms. ILLIUS & MAKIN.

41 Broad street.

March 29 1849. 3m.13

Glendon Refined Iron.

Round Iron,	Band Iron,	Hoop Iron,
Square "	Flat "	Scroll "

Axles, Locomotive Tyres,

Manufactured at the Glendon Mills, East Boston, for sale by GEORGE GARDNER & CO.,
5 Liberty Square, Boston, Mass.

Sept. 15, 1849. 3m37

PATENT HAMMERED RAILROAD, SHIP & BOAT SPIKES. — The Albany Iron Works have always on hand, of their own manufacture, a large assortment of Railroad, Ship and Boat Spikes from 2 to 12 inches in length, and of any form of head From the excellence of the material always used in their manufacture, and their very general use for rail roads and other purposes in this country, the manufacturers have no hesitation in warranting them fully equal to the best spikes in market, both as to quality and appearance. All orders addressed to the subscribers at the works will be promptly executed.

JOHN F. WINSLOW, *Agent*.
Albany Iron and Nail Works, Troy, N. Y.

The above Spikes may be had at factory prices, of Erastus Corning & Co Albany; Merritt & Co., New York; E. Pratt & Bro., Baltimore, Md.

LAP—WELDED

WROUGHT IRON TUBES

FOR

TUBULAR BOILERS,

FROM 1 1-2 TO 8 INCHES DIAMETER.

These are the ONLY Tubes of the same quality and manufacture as those so extensively used in England, Scotland, France and Germany, for Locomotive, Marine and other Steam Engine Boilers

THOMAS PROSSER,
Patentee.
28 Platt street, New York.

Railroad Iron.

THE UNDERSIGNED ARE PREPARED TO contract for the delivery of English Railroad Iron of favorite brands, during the Spring. They also receive orders for the importation of Pig, Bar, Sheet, etc. Iron. THOMAS B. SANDS & CO.,
22 South William street,

February 3, 1849. New York.

Iron Store.

THE Subscribers, having the selling agency of the following named Rolling Mills, viz: Norristown, Rough and Ready, Kensington, Triadelphia, Pottsgrove and Thorndale, can supply Railroad Companies, Merchants and others, at the wholesale mill prices for bars of all sizes, sheets cut to order as large as 58 in. diameter; Railroad Iron, domestic and foreign; Locomotive tire welded to given size; Chairs and Spikes; Iron for shafting, locomotive and general machinery purposes; Cast, Shear, Blister and Spring Steel; Boiler rivets; Copper; Pig iron, etc., etc.

MORRIS, JONES & CO.,
Iron Merchants,
Schuylkill 7th and Market Sts., Philadelphia.

August 16, 1849. 1y33

Railroad Iron.

THE MOUNT SAVAGE IRON WORKS, Alleghany county, Maryland, having recently passed into the hands of new proprietors, are now prepared, with increased facilities, to execute orders for any of the various patterns of Railroad Iron. Communications addressed to either of the subscribers will have prompt attention. J. F. WINSLOW, *President*
Troy, N.Y.
ERASTUS CORNING, Albany.
WARREN DELANO, Jr., N.Y.
JOHN M. FORBES, Boston.
ENOCH PRATT, Baltimore, Md.

November 6, 1848.

Railroad Iron.

THE SUBSCRIBERS ARE PREPARED TO take orders for Railroad Iron to be made at their Phœnix Iron Works, situated on the Schuylkill River, near this city, and at their Safe Harbor Iron Works, situated in Lancaster County, on the Susquehannah river; which two establishments are now turning out upwards of 1800 tons of finished rails per month.

Companies desirous of contracting will be promptly supplied with rails of any required pattern, and of the very best quality.

REEVES, BUCK & CO.,
45 North Water St., Philadelphia.

March 15, 1849.

Monument Foundry.

A. & W. DENMEAD & SON,
Corner of North and Monument Sts.,—Baltimore,
HAVING THEIR
IRON FOUNDRY AND MACHINE SHOP
In complete operation, are prepared to execute faithfully and promptly, orders for
Locomotive or Stationary Steam Engines,
Woolen, Cotton, Flour, Rice, Sugar Grist, or Saw Mills,
Slide, Hand or Chuck Lathes,
Machinery for cutting all kinds of Gearing.
Hydraulic, Tobacco and other Presses,
Car and Locomotive patent Ring Wheels, warranted,
Bridge and Mill Castings of every description,
Gas and Water Pipes of all sizes, warranted,
Railroad Wheels with best faggotted axle, furnished and fitted up for use, complete

☞Being provided with Heavy Lathes for Boring and Turning Screws, Cylinders, etc., we can furnish them of any pitch, length or pattern.

☞ Old Machinery Renewed or Repaired—and Estimates for Work in any part of the United States furnished at short notice.

June 8, 1849.

Iron Wire.

REFINED IRON WIRE OF ALL KINDS, Card, Reed, Cotton-flyer, Annealed, Broom, Buckle, and Spring Wire. Also all kinds of Round, Flat or Oval Wire, best adapted to various machine purposes, annealed and tempered, straightened and cut any length, manufactured and sold by

ICHABOD WASHBURN.

Worcester, Mass., May 25, 1849.

American and Foreign Iron.

FOR SALE,

300	Tons	A 1,	Iron	Dale Foundry Iron.
100	"	1,	"	"
100	"	2,	"	"
100	"	"	Forge	"
400	"	Wilkesbarre	"	"
100	"	"Roaring Run"	Foundry	Iron.
300	"	Fort	"	"
50	"	Catoctin	"	"
250	"	Chikiswalungo	"	"
50	"	"Columbia" "chilling" iron, a very superior article for car wheels.		
75	"	"Columbia" refined boiler blooms.		
30	"	1 x ¼ Slit iron.		
50	"	Best Penna. boiler iron.		
50	"	"Puddled"	"	
50	"	Bagnall & Sons refined bar iron.		
50	"	Common bar iron.		

Locomotive and other boiler iron furnished to order.

GOODHUE & CO.,
New York. 64 South street

American Pig, Bloom and Boiler Iron.

HENRY THOMPSON & SON,
No 57 South Gay St., Baltimore, Md.,

Offer for sale, *Hot Blast* Charcoal *Pig Iron* made at the *Catoctin* (Maryland), and *Taylor* (Virginia), *Furnaces*; *Cold Blast* Charcoal Pig Iron from the *Cloverdale* and *Catawba*, Va., Furnaces, suitable for *Wheels* or *Machinery* requiring *extra* strength; also *Boiler* and *Flue Iron* from the mills of Edge & Hilles in Delaware, and *best quality Boiler Blooms* made from *Cold Blast Pig Iron* at the *Shenandoah Works*, Va. The productions of the above establishments can always be had at the lowest market prices for approved paper.

American Pig Iron of other brands, and *Rolled* and *Hammered Bar Iron* furnished at lowest prices. Agents for *Watson's Perth Amboy Fire Bricks*, and Rich & Cos. New York Salamander Iron Chests.

Baltimore, June 14, 1849. 6 mos

LAP-WELDED WROUGHT IRON TUBES for Tubular Boilers, from 1¼ to 15 inches diameter, and any length not exceeding 17 feet—manufactured by the Caledonian Tube Company, Glasgow, and for sale by IRVING VAN WART,

12 Platt street, New York.

JOB CUTLER, *Patentee.*

☞ These Tubes are extensively used by the British Government, and by the principal Engineers and Steam Marine and Railway Companies in the Kingdom.

Railroad Iron.

THE TRENTON IRON COMPANY ARE NOW turning out one thousand tons of rails per month, at their works at Trenton, N. J. They are prepared to enter into contract to furnish rails of any pattern, and of the very best quality, made exclusively from the famous Andover iron. The position of the works on the Delaware river, the Delaware and Raritan canal, and the Camden and Amboy railroad, enables them to ship rails at all seasons of the year. Apply to

COOPER & HEWITT, *Agents.*
October 30, 1848. 17 Burling Slip, New York.

Pig and Bloom Iron.

THE Subscribers are Agents for the sale of numerous brands of Charcoal and Anthracite Pig Iron, suitable for Machinery, Railroad Wheels, Chains, Hollowware, etc. Also several brands of the best Puddling Iron, Juniata Blooms suitable for Wire, Boiler Plate, Axe Iron, Shovels, etc. The attention of those engaged in the manufacture of Iron is solicited by

A. WRIGHT & NEPHEW,
Vine Street Wharf, Philadelphia.

Iron.

THE SUBSCRIBERS having resumed the agency of the New-Jersey Iron Company, are prepared to execute orders for the different kinds and sizes of Iron usually made at the works of the company, and offer for sale on advantageous terms.—

150	tons	No. 1 Boonton	Foundry	Pig Iron.
100	"	No. 2 do.	do.	do.
300	"	Nos. 2 & 3 Forge	do.	do.
100	"	No. 2 Glendon	do.	do.
140	"	Nos. 2 & 3 Lehigh Crane	do	do.
100	"	No. 1 Pompton	Charcoal	do.
100	"	New-Jersey Blooms		
50	"	New-Jersey Faggoting Iron, for shafts		

Best Bars, ¼ to 4 inch by ½ to 1 inch thick.
Do do Rounds and Squares, ⅝ to 3 inch.
Rounds and Squares, 3-16 to 1 inch.
Half Rounds, ¼ to 1 in. Ovals & Half Ovals ¼ to 1¼ in.
Bands, 1¼ to 4 inch. Hoops, ⅝ to 2 inch.
Trunk Hoops, ⅝ to 1½ in. Horse Shoe & Nut Iron.
Nail Plates. Railroad Spikes.

DUDLEY B. FULLER & Co., 139 Greenwich-st. and 85 Broad-st.

WILLIAM JESSOP & SONS'
CELEBRATED CAST-STEEL.

The subscribers have on hand, and are constantly receiving from their manufactory,
PARK WORKS, SHEFFIELD,
Double Refined Cast Steel—square, flat and octagon.
Best warranted Cast Steel—square, flat and octagon.
Best double and single Shear Steel—warranted.
Machinery Steel—round.
Best and 2d gy. Sheet Steel—for saws and other purposes.
German Steel—flat and square, "W. I. & S." "Eagle" and "Goat" stamps.
Genuine "Sykes," L Blister Steel.
Best English Blister Steel, etc., etc., etc.

All of which are offered for sale on the most favorable terms by WM. JESSOP & SONS,
91 John street, New York.

Also by their Agents—
Curtus & Hand, 47 Commerce street, Philadelphia.
Alex'r Fullerton & Co., 119 Milk street, Boston.
Stickney & Beatty, South Charles street, Baltimore.
May 6, 1848.

SPRING STEEL FOR LOCOMOTIVES, TENDERS AND CARS.—The subscriber is engaged in manufacturing spring steel from 1¼ to 6 inches in width, and of any thickness required: large quantities are yearly furnished for railroad purposes, and wherever used its quality has been approved of. The establishment being large, can execute orders with great promptitude, at reasonable prices, and the quality warranted. Address J. F. WINSLOW, *Agent*,
Albany Iron and Nail Works.

JOHNSON, CAMMELL & Co's Celebrated Cast Steel,

AND
ENGINEERING AND MACHINE FILES,

which for quality and adaptation to mechanical uses, have been proved superior to any in the United States. Every description of square, octagon, flat and round cast steel, sheet, shovel and railway spring steel, best double and single shear steel, German steel, flat and square, goat stamps, etc. Saw and file steel, and steel to order for any purposes, manufactured at their Cyclops Steel Works Sheffield.

JOHNSON, CAMMELL & CO.,
100 William St., New York.
November 23, 1849.

American Cast Steel.

THE ADIRONDAC STEEL MANUFACTURING CO. is now producing, from American iron, at their works at Jersey City, N.J., Cast Steel of extraordinary quality, and is prepared to supply orders for the same at prices below that of the imported article of like quality. Consumers will find it to their interest to give this a trial. Orders for all sizes of hammered cast steel, directed as above, will meet with prompt attention.

May 28, 1849.

To Steam Engine Builders.

THE Undersigned offer for sale, *at less than half its cost*, the following *new machinery*, calculated for an engine of 62 inches cylinder and 10 feet stroke, viz:

2 Wrought Iron Cranks, 60 inches from centre to centre.
1 Do. do. Connecting Rod Strap.
2 Do. do. Crank Pins.
1 Eccentric Strap.
1 Diagonal Link with Brasses.
1 Cast Iron Lever Beam (forked).

The above machinery was made at the West Point Foundry for the U. S. Steamer Missouri, without regard to expense, is all finished complete for putting together, and has never been used. Drawings of the cranks can be seen on application to

HENRY THOMPSON & SON,
No. 57 South Gay St., Baltimore, Md.
Sept. 12, 1849.

Railroad Instruments.

THEODOLITES, TRANSIT COMPASSES, and Levels, with Fraunhoffers Munich Glasses, Surveyor's Compasses, Chains, Drawing Instruments, Barometers, etc., all of the best quality and workmanship, for sale at unusually low prices, by

E. & G. W. BLUNT,
No. 179 Water St., cor. Burling Slip.
New York, May 19, 1849.

Mattewan Machine Works.

THE Mattewan Company have added to their Machine Works an extensive LOCOMOTIVE ENGINE department, and are prepared to execute orders for *Locomotive Engines* of every size and pattern—also *Tenders*, *Wheels*, *Axles*, and other railroad machinery, to which they ask the attention of those who wish such articles, before they purchase elsewhere.

STATIONARY ENGINES, BOILERS, ETC., Of any required size or pattern, arranged for driving *Cotton*, *Woollen*, *or other Mills*, can be had on favorable terms, and at short notice.

COTTON AND WOOLLEN MACHINERY, Of every description, embodying all the modern improvements, second in quality to none in this or any other country, made to order.

MILL GEARING,

Of every description, may be had at short notice, as this company has probably the most extensive assortment of patterns in this line, in any section of the country, and are constantly adding to them.

TOOLS.

Turning Lathes, *Slabbing*, *Plaining*, *Cutting* and *Drilling Machines*, of the most approved patterns, together with all other tools required in machine shops, may be had at the Mattewan Company's Shops, Fishkill Landing, or at 39 Pine street, New York.

WM. B. LEONARD, *Agent.*

Text Book of Mechanical Drawing,

FOR the use of SCHOOLS and SELF-INSTRUCTION, containing,

1st. A series of progressive practical problems in Geometry, with full explanations, couched in plain and simple terms; showing also the construction of the *parallel ruler*, *plane scales* and *protractor*.

2d. Examples for drawing *plans*, *sections* and *elevations* of Buildings and Machinery, the mode of drawing elevations from *circular* and *polygonal* plans, and the drawing of Roman and Grecian Mouldings.

3d. An introduction to *Isometrical drawing*, with 4 plates of examples.

4th. A treatise on *Linear Perspective*, with numerous examples and full explanations, rendering the study of the art easy and agreeable.

5th. Examples for the projection of shadows.

The whole illustrated with 50 STEEL PLATES.

Published by WM. MINIFIE & CO.,
114 Baltimore St., Baltimore Md.

Price $3, to be had of all the principal booksellers.

To Railroad Companies.

FOR SALE—A Second-hand Locomotive Engine and Tender, of about 10 tons weight, in good order, and *warranted to perform well.* Any company wanting a cheap engine for a passenger or light burden train, will rarely meet with an opportunity so favorable as the present. The engine and tender are in perfect running order, and will be tested to the satisfaction of any one wishing to purchase. Price $1,500.

Address J. B. MOORHEAD,
Frazer P.O., Chester county, Pa.

P.S.—The Engine can be seen by calling on H. Osmond & Co., Car-builders, Broad st., Philadelphia.

September 6, 1849.

LAWRENCE'S ROSENDALE HYDRAULIC Cement. This Cement is warranted equal to any manufactured in this country, and has been pronounced superior to Francis' "Roman." Its value for Aqueducts, Locks, Bridges, Flooms, and all Masonry exposed to dampness, is well known, as it sets immediately under water, and increases in solidity for years.

For sale in lots to suit purchasers, in tight papered barrels, by JOHN W. LAWRENCE,
142 Front-street, New York.

☞ Orders for the above will be received and promptly attended to at this office. 32 1y.

NICOLL'S PATENT SAFETY SWITCH FOR Railroad Turnouts. This invention for some time in successful operation on one of the principal railroads in the country, effectually prevents engines and their trains from running off the track at a switch, left wrong by accident or design. It acts independently of the main track rails; being laid down or removed without cutting or displacing them.

It is never touched by passing trains, except when in use, preventing their running off the track. It is simple in its construction and operation, requiring only two castings and two rails; the latter, even if much worn or used, not objectionable.

Working models of the Safety Switch may be seen at Messrs. Davenport, Bridges & Kirk's Cambridge Port, Mass., and at the office of the Railroad Journal, New York.

Plans, Specifications, and all information obtained, on application to the Subscriber, Inventor and Patentee. G. A. NICOLLS,
Reading, Pa.

To Railroad Companies and Contractors.

FOR SALE.—Two Locomotive Engines and Tenders, at present in use on the Beaver Meadow Railroad, being too light for their coal trains, but well calculated for either gravel or light passenger trains.

They weigh, in running order, about 8 tons each—having one pair of driving wheels 4 feet diameter, 4 truck wheels 30 inches diameter, with cylinders 10 in. diameter, and 18 inches stroke of piston. Tenders on 4 wheels. Address JAMES ROWLAND,
Prest. Beaver Meadow Railroad & Coal Co.,
Philadelphia.
or, L. CHAMBERLAIN, Sec'y,
at Beaver Meadow, Pa.

May 19, 1849. 20tf

India-rubber for Railroad Cos.

RUBBER SPRINGS—*Bearing and Buffer—Fuller's Patent—Hose* from 1 to 12 inches diameter. Suction Hose. *Steam Packing*—from 1-16 to 2 in. thick. *Rubber and Gutta Percha Bands.* These articles are all warranted to give satisfaction, made under Tyer & Helm's patent, issued January, 1849.—No lead used in the composition. Will stand much higher heat than that called "Goodyear's," and is in all respects better than any in use. Proprietors of railroads do not be overcharged by pretenders.

HORACE H. DAY,
Warehouse 23 Courtlandt street.

New York, May 21, 1849.

Fire Brick.

THE Subscribers have constantly on hand Rafford's Stourbridge, Oak Farms Stourbridge, Listen, Wortley, Red and White Welsh Fire Bricks, common and fancy shapes. Also,

ROOFING SLATES,

from the best Welch quarries, and of all sizes. Also,

COAL,

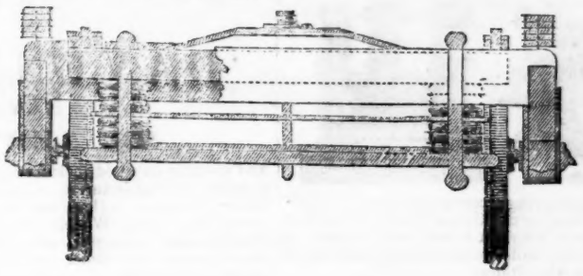
of all kinds—Liverpool Orrell and Cannel, Scotch, New Castle, Pictou, Sidney, Cumberland, Virginia, and all kinds of Anthracite coals. Also,

Pig Iron, Salt, etc., etc., for sale at the lowest market price. Apply to

SAMUEL THOMPSON & NEPHEW,
275 Pearl and 43 Gold Sts., New York.

November, 23, 1849.

FULLER'S PATENT
INDIA RUBBER CAR SPRINGS.



RAILROAD COMPANIES are cautioned, before purchasing Springs, to examine the actual patents and judge for themselves.

Persons, under the Title of the New England Car Company, seeking fraudulently to invade Fuller's rights have put forth so many statements for the purpose of misleading the public, that an enumeration of some facts is absolutely necessary, for the purpose of putting persons interested upon their guard.

Fuller's patent is for the application of Discs of India-rubber with Metal Plates, for forming Springs for Railway Cars and Carriages—either one disc and two plates, or ten discs and plates, or any other number, are equally covered by the patent. Fuller is not bound to the use of short discs—he may use long discs and plates.

Ray's patent is simply and wholly the forming of air tight rubber cylinders, with hoops or bands round the outside, and the combination of elasticity of India rubber, with the elasticity of atmospheric air confined in the cylinder, and in no part of his patent is he authorised to use the form of spring which he is now fraudulently supplying to Railroad Companies. Such springs are direct and positive infringements of the very letter of Fuller's patent.

Fuller's patent is dated October, 1845, Ray's patent, August, 1848.

The spring patented by Ray never has been put in operation, and never can be made useful for Railroad cars.

A mere experiment, even if made, it is well known does not prove an invention; and it is ridiculous for such parties to hope to mislead the Presidents and Superintendents of Railroad companies, by claiming the invention because Ray alledges he made an experiment—which Fuller had made before him—had actually brought into working order, and obtained a patent for—and this too before Mr. Ray states he made his experiment—and that experiment not claimed to have been applied to a car or carriage.

Besides, the invention could not have been developed until India rubber, properly Vulcanised, could be made of a sufficient thickness. In the United States the art of vulcanising rubber by steam heat, (by which means only can a body of rubber having any considerable thickness be vulcanised,) was not introduced until after the grant by the American government of the patent for springs to Fuller—whereas the process of vulcanising rubber by steam heat was invented in England about three years previously, and was used by Fuller there. This fact refutes entirely the claim of invention put forth by Mr. Ray, and proves the impossibility of his pretensions being true.

Fuller was the first and only inventor of the spring. A Mr. Dorr, whose connection with Mr. Goodyear is well known in this country, applied in England to Mr. Fuller, after he had published and patented his invention, and introduced another party for the purpose of obtaining the agency for the United States. They were furnished with a complete set of drawings and models, and with instructions to make arrangements for the supply of material of American manufacture—from that hour to the present not a single communication has been received from them. Some of these identical models have been traced into the hands of parties now seeking to invade Fuller's rights, and who have exhibited them as specimens of their own invention.

After this, the conveyance was made by Goodyear to certain parties here for the use for railroad springs of what he calls his Metallic rubber. Comment is unnecessary.

There are 5 or 6 different processes for the manufacture of vulcanised rubber, patented by as many different parties, some here, some in England, either of which would probably make good springs.

A large and powerful company has been organised under Fuller's patent, the particulars of which shall be given very shortly.

An action has been commenced against three railroad companies for infringement; and all other parties will assuredly be prosecuted if they continue farther to infringe upon Fuller's patent.

W. C. FULLER,

The only persons authorised to supply the Springs are G. M. KNEVITT, 38 Broadway, N. York, General Agent for the U. S.: and
JAS. LEE & Co., 18 India Wharf, Boston.
JOHN THORNLEY, Chestnut st., Philad.

Arch St. Machine Shop.

BIRKENBINE, MARTIN & TROTTER,
Makers of
STEAM ENGINES,
and
HYDRAULIC MACHINERY,
NO. 16 ARCH STREET,
PHILADELPHIA,

Will construct Steam Engines, Pumps, for Draining Mines and Land; supplying Water to Towns, Factories, Farms, etc;
Also, Street Stops, Fire Plugs, Water Tanks, and Hydraulic Rams, with
(BIRKINBINE'S PATENT VALVES.)
B., M. & T. contract for Warming and Ventilating Buildings by Steam or Warm Water.

J. E. Mitchell,

NO. 14 OLD YORK ROAD, PHILADELPHIA.
Importer and manufacturer of

New Castle, Nova Scotia, Wickersly } Grindstones, of all sizes and grits.
French Burr, Cocaheo, Cologne } Millstones, made to order, with all the recent improvements.
American and Patent compressed, Garnkirk } Fire Bricks and Tiles of various sizes.
Burr Blocks, Bolting Cloths, Mill Irons, etc.

Steam Boiler Explosions.

THE Subscriber having been appointed sole Agent for Faber's Magnetic Water Gauge, is now ready to supply the trade, and also individuals with this celebrated instrument. Besides the greatest safety from explosion resulting from its use, it is a thorough check against careless stoking and feeding. In marine engines it will regulate the exact quantity required in the "blow off." Pamphlets containing full information, can be had free on application to the Agent,

JOSEPH P. PIRSSON,
Civil Engineer, 5 Wall st.

To the Proprietors of Rolling Mills and Iron Works.

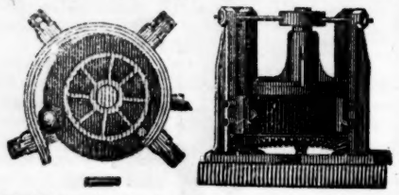
THE Undersigned—Proprietors of Townsend's Furnace and Machine Shop, Albany—are extensively engaged in the manufacture of Machinery and fixtures for Iron, and Copper Rolling Mills, and Iron Works. Having paid particular attention to the manufacture of *Rolls* (Rollers), both *chilled* and *dry-sand*, they feel confident that they can execute orders for such castings in a satisfactory manner. And to give assurance of this, they beg leave to refer to the following named persons, proprietors and managers of some of the most extensive rolling mills in the country, viz: Jno. F. Winslow, J. Tuckerman, H. Burden, W. Burtt, J. & J. Rogers, Saltus & Co., J. B. Bailey, L. G. B. Cannon, Hawkins & Atwater, etc., etc.

F. & T. TOWNSEND.

Albany, August 18, 1849,

MACHINERY.

Henry Burden's Patent Revolving Shingling Machine.



THE Subscriber having recently purchased the right of this machine for the United States, now offers to make transfers of the right to run said machine, or sell to those who may be desirous to purchase the right for one or more of the States.

This machine is now in successful operation in ten or twelve iron works in and about the vicinity of Pittsburgh, also at Phœnixville and Reading, Pa., Covington Iron Works, Md., Troy Rolling Mills, and Troy Iron and Nail Factory, Troy, N. Y., where it has give universal satisfaction.

Its advantages over the ordinary Forge Hammer are numerous: considerable saving in first cost; saving in power; the entire saving of shingler's, or hammerman's wages, as no attendance whatever is necessary, it being entirely self-acting; saving in time from the quantity of work done, as one machine is capable of working the iron from sixty puddling furnaces; saving of waste, as nothing but the scoria is thrown off, and that most effectually; saving of staffs, as none are used or required. The time required to furnish a bloom being only about six seconds, the scoria has no time to set, consequently is got rid of much easier than when allowed to congeal as under the hammer. The iron being discharged from the machine so hot, rolls better and is much easier on the rollers and machinery. The bars roll rounder, and are much better finished. The subscriber feels confident that persons who will examine for themselves the machinery in operation, will find it possesses more advantages than have been enumerated. For further particulars address the subscriber at Troy, N. Y. P. A. BURDEN.

Railroad Spikes and Wrought Iron Fastenings.

THE TROY IRON AND NAIL FACTORY, exclusive owner of all Henry Burden's Patented Machinery *for making Spikes*, have facilities for manufacturing large quantities upon short notice, and of a quality unsurpassed.

Wrought Iron Chairs, Clamps, Keys and Bolts for Railroad fastenings, also made to order. A full assortment of Ship and Boat Spikes always on hand.

All orders addressed to the Agent at the Factory will receive immediate attention.

P. A. BURDEN, *Agent*,
Troy Iron and Nail Factory, Troy, N. Y.

RAILROAD WHEELS.

CHILLED RAILROAD WHEELS.—THE UNdersigned are now prepared to manufacture their Improved Corrugated Car Wheels, or Wheels with any form of spokes or discs, by a new process which prevents all strain on the metal, such as is produced in all other chilled wheels, by the manner of casting and cooling. By this new method of manufacture, the hubs of all kinds of wheels may be made whole—that is, without dividing them into sections—thus rendering the expense of banding unnecessary; and the wheels subjected to this process will be much stronger than those of the same size and weight, when made in the ordinary way.

A. WHITNEY & SON,
Willow St., below 13th,
Philadelphia, Pa.

CHILLED RAILROAD WHEELS.—THE UNdersigned, the *Original Inventor* of the *Plate Wheel* with solid hub, is prepared to execute all orders for the same, promptly and faithfully, and solicits a share of the patronage for those kind of wheels which are now so much preferred, and which he originally produced after a large expenditure of time and money.

A. TIERS,
Point Pleasant Foundry.

He also offers to furnish Rolling Mill Castings, and other Mill Gearing, with promptness, having, he believes, the largest stock of such patterns to be found in the country. A. T.

Kensington, Philadelphia Co.,
March 12, 1848.

ENGINE AND CAR WORKS.

DAVENPORT & BRIDGES,

HAVING ASSOCIATED WITH THEM

MR. LEWIS KIRK, OF READING, PA.,

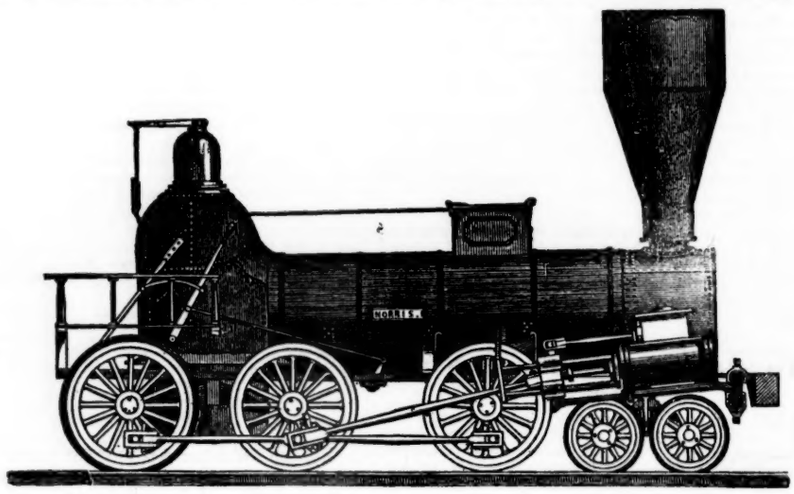
And recently enlarged their Establishment, (making it now the most extensive in the United States,) they are prepared to manufacture to order Locomotive Engines and Cars of every description. Stationary Engines, Steam Hammers, Boilers, and all kinds of Railroad Machinery. Also, Castings and Forge Irons of all kinds—including Chilled Wheels, Frogs, Chairs, Switches, Car Axles, and Locomotive Cranks, Connecting Rods, Steel Springs, Bolts, etc., etc. Orders from all parts of the country solicited for Engines and Cars, or any part or parts of the same. All orders will be furnished at short notice, and on as good terms as any manufactory in the country. Coaches pass our works every fifteen minutes during the day, from Brattle St., Boston.

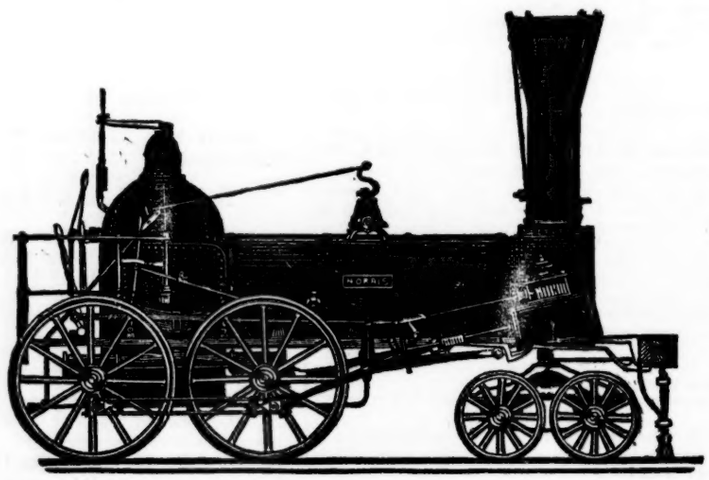
DAVENPORT, BRIDGES & KIRK.

Cambridgeport, Mass., February 16th, 1849.

NORRIS' LOCOMOTIVE WORKS.

BUSHHILL, SCHUYLKILL SIXTH-ST., PHILADELPHIA,





THE UNDERSIGNED Manufacture to order Locomotive Steam Engines of any plan or size.

Their shops being enlarged, and their arrangements considerably extended to facilitate the speedy execution of work in this branch, they can offer to Railway Companies unusual advantages for prompt delivery of Machinery of superior workmanship and finish.

Connected with the Locomotive business, they are also prepared to furnish, at short notice, Chilled Wheels for Cars of superior quality.

Wrought Iron Tyres made of any required size—the exact diameter of the Wheel Centre, being given, the Tires are made to fit on same without the necessity of turning out inside.

Iron and Brass castings, Axles, etc., fitted up complete with Trucks or otherwise.

NORRIS, BROTHERS